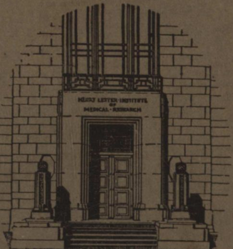
HENRY LESTER
INSTITUTE OF
MEDICAL RESEARCH

Annual Report

1936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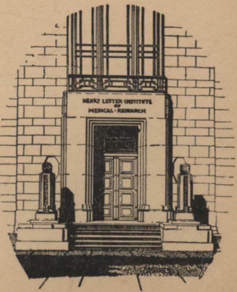

HENRY LESTER INSTITUTE OF MEDICAL RESEARCH

(SHANGHAI)

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CLERICAL AND TECHNICAL STAFF, 1936

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INTRODUCTION

THE WORK OF THE INSTITUTE

The year 1936 marks the completion of the third full working year of the Institute. The reports presented by Heads of Divisions cover the work of the Institute so fully, that it seems superfluous to pick out for special comment in this introductory statement, the achievements of different workers. It will, I think, be admitted, however, by those who are able to assess the value of these reports, that a steady addition to our knowledge is being made in regard to problems mainly of applied research, and that the standard of work has been maintained. Some of the results of these and other researches make us realize that diseases are not specific entities like plants and animals, and that there is a change in the incidence and character of diseases going on, not only in different parts of the world, but also in the same parts of the world at different times. This is so important that I have asked Dr. Maxwell to allow me to publish, as part of this introductory statement, some extracts from the last lecture he gave at the Institute. These extracts, of course, express the personal views of the lecturer, but coming as they do from one who has played an important part in the development of modern medicine in China, they should surely challenge our attention.

"RETROSPECT AND PROSPECT"

"The last forty years have been momentous in the progress of the medical sciences and it is, of course, quite impossible to give a complete review. I shall, therefore, confine myself more particularly to personal experiences.

"In my hospital days, three diseases were outstandingly common. Typhoid fever was the curse of the medical wards on account of its prevalence, severity, and the enormous amount of heavy nursing it entailed. So many patients suffering from typhoid came to the hospital that a rule had to be made that no more than five were to be in any one ward at once, owing to the strain it imposed on the nursing staff. Twenty-five years later, one of my daughters nursed for a year in the same hospital, and mostly in the medical wards, without ever seeing a case of typhoid. A few years ago, the Secretary of the International Nurses' Council was asked to secure training in typhoid nursing for a group of nurses going out to India, and had to reply that practical training in typhoid nursing was almost impossible to get in England, as only when an occasional small and isolated outbreak occurred were there enough cases in any one place to secure the necessary practical teaching. The disease has disappeared largely as a result of the improvement in public health laws, especially in regard to water and milk.

" On the women's side of our out-patient department, one of the commonest diseases was chlorosis, a form of anæmia that was extraordinarily prevalent among girls working in factories and workshops. As a common disease it has now completely disappeared, and this is undoubtedly due to better conditions in factories, shorter hours, more hygienic clothing, and the attraction of the open air and open-air games.

" The third disease to which I should like to refer is tuberculosis. If not as frequent in England then as it is in China now, it was appallingly common, and took a heavy toll of lives. In the past seventy years, it has decreased by more than 75 per cent and this, again, has been due not so much to treatment, as to health education, and to improved economic conditions.

" Let me now turn to the picture of conditions in the Far East when I first came out thirty-six years ago, and to some of the striking changes which have occurred during these years.

" First, in regard to leprosy. Leprosy treatment was absolutely in its infancy and of knowledge of the causes favouring the development of this disease there was none. Segregation was the only form of treatment suggested and was an obsession of physicians and governments alike, an obsession which unhappily has not even yet disappeared. A few years after my arrival in Formosa, Sir Leonard Rogers developed his treatment with salts of chaulmoogra oil for intravenous injection. Since those days the treatment of leprosy has rapidly advanced, not only through the use of the more modern chaulmoogra preparations, but still more by the recognition that concurrent diseases, unhealthy living habits, and probably nutritional defects are most important factors in the development of the disease.

" When I first came abroad, the use of emetine in dysentery was unknown. I well remember the coming of emetine, for I said to myself, if this drug is going to do all that it claims, it ought to be able to do it even though no attempt is made to control the diet. I therefore gave my first injection to a woman in my hospital while leaving her to eat the full hospital diet. The case was happily a very favourable one, and the result in rapid clearing up of the disease was so striking that I have never forgotten it.

" Turning to other subjects, it is a striking thing that the history of helminthology in China has, with one or two exceptions, been covered by my period of time in the East. Hookworm was practically unknown, schistosomiasis had never been heard of, the lung fluke was supposed to be absent, and fasciolopsis confined to the Shaoshing area. It so happened that when I was appointed Chairman of the first Research Committee of the China Medical Association in 1907, we took as our main investigation the distribution of the common helminths, and were thus able to establish the prevalence of these parasites.

" In the line of what I have said about typhoid fever in Great Britain, it is especially interesting to note that when I first came East, there was a general tendency either to deny the presence of typhoid in China, or to regard it as a comparatively rare disease.

" I came out before there were any of the modern laboratory tests for typhoid, but as I have already indicated, with a considerable experience of the disease, while my wife who had been a sister at St. Bartholemew's, had had a much wider experience still of the nursing side of typhoid ; yet in twenty years in Formosa, I doubt whether I saw twenty cases of typhoid fever. In Amoy, where I knew the hospitals well, typhoid among foreigners was very common, yet the same doctors who diagnosed the disease easily in foreigners, failed to find it in their Chinese patients. That was, say, thirty years ago. Of recent years in the same place, typhoid fever forms one of the largest causes for admission of Chinese patients to the same hospitals, and easily the largest number of deaths. The same story is true all along the coast of China and in many inland cities. The extraordinary fact is also true that whereas when I first came abroad Amoy had the reputation of being the dirtiest city in China and fully deserved it, it now bids fair to being one of the finest cities on the China coast, and has an unrivalled supply of pure water. I can, myself, see no escape from the conclusion that typhoid is enormously on the increase in circumstances where one would have naturally predicted the opposite to be the case.

" The same story is, I believe, true of appendicitis, though here I believe, the striking increase is most marked in the wealthy cities, and dietetic causes are at least possible. It is still a rarity in the up-country rural hospital.

" Again, we have an enormous increase in neuro-syphilis, especially in the larger cities, but here other explanations come in. During the last quarter of a century a licentious soldiery has over-run the country and syphilis has become common in country areas where it was formerly a rare disease. Further, this, like other infections has a tendency to affect tissues subject to strain and stress. A century ago, much of the population of China led an almost vegetable existence, and of nerve strain there was little. With the coming of wholesale brigandage and the appalling destruction by communists causing the unfortunate people to be ever ready to flee in all directions, an entirely new situation of nerve strain has been introduced into the ordinary farmer's homes, and a tendency, formerly absent, has developed for the poison of syphilis to become located in the central nervous system.

" It is a little difficult to know what to say about the future of medicine in China, and all I shall attempt is to suggest special lines along which advance by research might be made. It would seem that, the world over, interest is steadily growing in the problems of nutrition and there is no country where this is more needed than it is here. There is no race in the world which can beat the Chinese as agriculturalists and despite terribly depressed economic conditions, foods of a suitable quality and sufficient in amount are nearly everywhere available. It is to the credit of our Institute that we are taking a share in the work of investigating the nutritive value of Chinese food materials. Such knowledge ought to be in the hands of all superintendents of hospitals in China. The hospitals have to handle enormous numbers of patients on a charitable or semi-charitable basis. No study, as far as I know, has been made of the adequacy of the diets supplied. Many of them, I am certain, while adequate in quantity, are far from adequate in quality, and I believe that less costly diets of greater nutritional value might be found to be available.

" The investigation of specific diseases needs to be applied not only to the general conditions of disease, but to the special factors affecting the incidence in this country. The ideal, of course, is where science and its application go hand in hand, and to my mind a splendid example of this is the recent work in schistosomiasis involving as it has done the efforts of the immunologist, helminthologist, pathologist, and photographer, as well as those of the surgeon and physician. Perhaps I stress this more, because as an isolated worker I tried earnestly to solve some of the problems involved in splenomegaly as I saw them many years ago, and failed miserably. I think nearly anyone attempting such work alone is bound to fail, but when teams can tackle these problems, I believe there is hardly any problem in medical research in China which could not be successfully handled. I have told you how certain diseases have been practically conquered in the West in the course of a single life-time, and I have tried to suggest how similar diseases which are actually still on the increase in the East may be likewise overcome, but this is not the whole story. I hold that the picture I have drawn of disease conquest is not the whole truth. I suggest that while the conquest has been a very real one, it has dominated the picture too much, and that it fails to depict the fact that there have been striking increases as well as decreases in the prevalence of certain types of disease. In other words, while the grosser manifestations of infectious disease have been well nigh conquered, a very definite increase has occurred and is still going on in degenerative and functional diseases of the nervous system.

" I will go further and suggest that while increasing regard is paid to physical health, little is done for mental health, and still less for spiritual, though the three are undoubtedly associated with each other to build up the complete and healthy man, which is the final object of all medical practice. These are the days when nutrition is the slogan. Increasing attention is being paid and rightly so, to the need of a balanced nutritional diet, yet the need of a balanced mental diet even in the developing period of youth, is largely neglected.

" I am not preaching a sermon, but lecturing on disease, and I claim that this is more than pertinent to the problem. What we want is all-round health, and that will only be attained when we have culture, and balanced diet, for body, mind and soul alike.

" Knowledge, research in all its forms, never can be an end in itself, and unless applied with wisdom fails to make for happiness. It is written : ' Wisdom is the principal thing, therefore get wisdom and with all thy getting, get understanding. ' "

STAFF CHANGES One of the difficulties of organizing a research institute in a foreign country is a sense of academic exile, but this is mitigated by the leave granted to members of the staff for travel to the home base.

Professor Bernard Read was away in England from April till November, and while visiting laboratories situated in different parts of the country, succeeded in securing the services of Dr. W. G. E. Eggleton, who arrived early in 1937.

Professor Read continues to maintain his relations with Peiping where his work on Chinese drugs was recently recognized by the award of the King Gold Medal of the Peking Society of Natural History. We are also glad to note the recognition given to his administrative ability by his appointment to the Board of Trustees of the Peiping Union Medical College. This will strengthen that co-operation between the two institutions which is so essential to the contribution that each has to make.

Dr. Gray returned from leave in October, after having attended the Urological Congress in Vienna, and arranged for the representation of Chinese urologists at future congresses. While at home, he presented a thesis based on his research work in the Institute, and was awarded the Raymond Horton-Smith prize by the University of Cambridge for the best M.D. thesis of the year.

In this connection, it also affords me great pleasure to draw attention to the honour received by Mr. R. V. Dent by his admission to the fellowship of the Royal Photographic Society. This is a recognition not only of Mr. Dent's talents, but of the important part which photographic record plays in the work of this Institute.

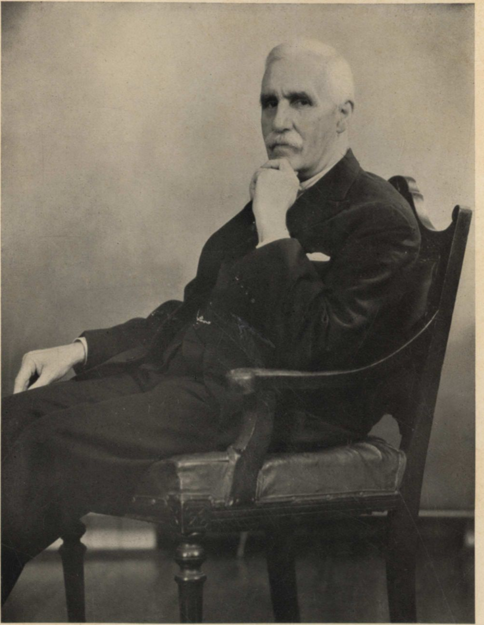
In August, Mr. W. Y. Lee left for England, under the Holt Scheme, where he has been working in applied physiology at the London School of Hygiene and Tropical Medicine.

Dr. F. F. Tang returned from England in October from a very successful period of activity during which he was associated with the work being done at Hampstead on the virus of influenza. We were fortunate in having him as our representative at the International Congress of Microbiology, where he presented a paper for discussion.

Our thanks are due to the London School of Hygiene and Tropical Medicine and the National Institute for Medical Research for the academic hospitality granted to these members of our staff.

At the end of December, Dr. C. Tsai resigned, after four years' work in the Institute, on his appointment to the new Chair of Physiology in the National Central University in Nanking. Dr. Tsai has already achieved international recognition for his work on the glycogenic function of the liver, which was begun in association with Professor C. Lovatt-Evans at University College, London, while his original text-books on physiology written in Chinese, represent a pioneer effort in the medical education of Chinese students. His resignation was undoubtedly a great loss to the Institute, but we must recognize, however personally we may regret his departure, that it is essential there should be a constant interchange between research institutes and universities if the torch of learning is to be handed on to future generations of workers.

With the retirement of Dr. James L. Maxwell, owing to the age limit, the Institute has lost one of its founders, and one to whom the



Dr. James L. Maxwell

Director owes a debt of gratitude for his guidance in framing the early policies of the Institute.

James Laidlaw Maxwell obtained his medical qualifications in 1897, and, as he himself has told us, coming from a medical home, can hardly remember the time when diseases, their causation and treatment were not a matter of everyday talk. After holding house appointments at St. Bartholemew's Hospital, he came out East in 1900, and except for the War years, during which he held the rank of Major in the R.A.M.C., he was stationed in South Formosa for a period of 23 years, carrying on the work which his father had initiated. In this connection, it is interesting to note that his father was largely instrumental in inducing Manson to come to China, with the momentous results that are so well known.

In 1910, he published, in association with Dr. Hamilton Jefferys, a book entitled the " Diseases of China." Jefferys was then surgeon to St. Luke's Hospital, Shanghai, and editor of the *China Medical Journal*, while Maxwell was Chairman of the Research Committee of the China Medical Missionary Association. A second edition of this work was published by Maxwell in 1929.

In 1923, Dr. Maxwell was appointed to the important post of Executive Secretary of the China Medical Association, while three years later, he succeeded Dr. Merrins as editor of the *China Medical Journal*. It was therefore natural when I came to Shanghai in 1927, that I should immediately seek the counsel of Dr. Maxwell in regard to the establishment of this Institute. Dr. Maxwell's first appointment at the Institute was that of Librarian and Head of a Division of Field Research. It was recognized that the research programme of the Institute must be linked in some way with the medical work which had been carried on largely by medical missionaries in different parts of China, and that Dr. Maxwell's position as Editor of the *China Medical Journal*, which he continued to hold after joining the Institute, would give us this necessary link. Dr. Maxwell has always taken a great interest in medical publication in China, and only recently was appointed the first editor of the *Journal of Clinical Medicine* published by the Shanghai Medical Society. Apart from these valuable liaisons, Dr. Maxwell has himself taken a special interest in the campaign against leprosy, and has recently published a practical hand book for workers in this country.

Bringing this brief statement to an end, I must say a word with regard to the Library. Right from the beginning in the days of the Advisory Committee, Dr. Maxwell was very keen that the Institute should have a good Library which should be of value not only to the research workers in the Institute, but also to practitioners and those working in other institutions. For various reasons, it has not been possible for the Institute fully to carry out this wider service, and we are now concentrating more especially on the specific needs of our medical research programmes, and on journals, rather than on books.

Although Dr. Maxwell has ceased to be an active member of the Institute staff, we are glad to know that he expects to remain in China, and his appointment to the Directorship of the Institute of Hospital Technology (Hankow) will, we hope, lead to a better recognition of the need for training hospital technicians. In these days, hospital technicians are almost as important as nurses, especially where clinical research is concerned. In fact, for this work a new type of individual is required, who may be described as a nurse-technician.

I hope, therefore, we shall still be able to avail ourselves of Dr. Maxwell's wisdom and advice, and that he will maintain his interest in the Institute as a member of its Advisory Council.

RELATIONS WITH OTHER INSTITUTIONS The Institute has continued to maintain its outside contacts in a variety of ways. Of particular interest is the work done by all Divisions in co-operation with the Health and Industrial Departments of the Shanghai Municipal Council, and we are indeed grateful for the facilities and encouragement so freely offered.

From the appendix it will be seen that material has been sent for teaching and research to a large number of Institutions and that assistance has been given to others in the examination of pathological material. In this way, the Institute combines a teaching and practical interest with its research activities, which prevents academic isolation and is all to the good.

Through the Holt Scheme and through study leave, intimate contacts continue to be established with a number of institutions in Great Britain, and we are grateful to the Universities' China Committee in London for the interest it takes in Chinese graduates sent to Britain under this scheme.

During July, the Chinese Physiological Society held its Ninth Annual Conference in Tsingtao, and celebrated the tenth year of its foundation.

This was a departure as to time and place from the previous practice of holding meetings at the larger medical centres. It, however, proved entirely successful and perhaps enabled a greater interest to be taken in the more academic aspects of physiological research. Seven members of the staff attended the Conference, and nine papers were presented for discussion.

The Annual Report of the Medical Research Council calls attention to certain matters in regard to other organizations which are of special interest in the development of this Institute. I refer to the organization of medical research by the Tropical Research Committee and the gift of £2,000,000 by Lord Nuffield to Oxford University for research and post-graduate teaching in medical science. Both these schemes recognize that medical research demands an independent career, and that adequate financial provision must be made to attract the right men.

The Tropical Research scheme starts with the offer of temporary fellowships, but looks forward to the establishment of more permanent posts on a pensionable basis. This recognizes the importance of men embracing a career of medical research. It is interesting in this connection to note that one of the senior fellowships has already been awarded to Dr. Cecil J. Hackett who was appointed to the staff of this Institute in 1932, but who retired shortly after his appointment, owing to ill health, now completely restored. We are glad to know that Dr. Hackett is continuing his career of medical research, and offer him our congratulations.

The Nuffield benefaction indicates, by its size, the importance of the project. It appears to have arisen more immediately out of the presidential address to the British Medical Association given last July by the Regius Professor of Medicine at Oxford. Sir Farquhar-Buzzard drew attention to the importance of co-ordinating the work of the private practitioner, the public health officer, and the research worker through the establishment of health centres where all, while still maintaining their independent position and outlook, can work in association for the common good. This scheme is of particular interest to us here in Shanghai since from the beginning, we have tried, on a much smaller scale, to establish a co-operative activity with health departments and hospitals, and more especially, through our Clinical Unit, with the Lester Hospital.

In commenting on the Nuffield gift, the *British Medical Journal* states that large benefactions always carry with them the danger that they may result in impoverishment in other directions. I think it has not been sufficiently recognized by the Shanghai public that the Lester benefaction to medical science presents an opportunity which has increased rather than diminished the responsibility of the community for the maintenance and future development of its voluntary hospitals.

This reference to the encouragement given in England during 1936 to the development of medical research would not be complete without mention of the Wellcome Foundation. This was established during his lifetime by the late Sir Henry Wellcome but by his will it has now been established on a less personal and more permanent basis through the appointment of a Board of Trustees, two of whom must be men of science. The Foundation derives its income not only from the personal bequests of Sir Henry Wellcome but in perpetuity from the profits of the firm which he established in 1883 in partnership with the late Mr. S. M. Burroughs for the manufacture and supply of drugs. The purposes of the Trust cover the whole field of medical research and at the request of the Trustees a special clause has been added whereby complete scientific freedom is assured in the administration of the funds available. This is in every way a unique benefaction, for apart from its general purposes it will promote that high standard of pharmaceutical practice which is so essential in countries like China if scientific medicine is to win the day.

In bringing this introductory statement to a conclusion, I feel I cannot do better than quote once more from a lecture given by the late Sir Walter Fletcher, the first Secretary of the Medical Research Council: "The mastery over our physical environment which physical science has given us has transformed all the conditions of human life within a century, but the conveniences offered by improved transport and improved communications have brought only superficial changes, and it is doubtful whether they have done on the whole greater service or disservice to the happiness and well-being of mankind. Our improved powers of producing wealth, as the whole world is now observing, seem already to have outrun lamentably our powers either of wisely using or even of retaining it. It is better mastery over the living organism and the improvement of the bodily and mental powers of man that are needed for the real betterment and enrichment of the race. By powers of a kind that we are already in process of gaining through medical research, we may hope to transform human life in ways almost unimagined now, and to make a new world indeed. Without entering into dreams of the far future we know that here and now the campaign of medical research is improving our estate. Its progress and success have immediate interest for all of us, and the highest claims upon the good will of all mankind. It is a campaign to diminish pain, to lessen the waste of human effort and human life, and to enrich and enlarge the powers of the human body and mind."

H. G. EARLE.

DEPARTMENT OF EPIDEMIOLOGY AND MEDICAL STATISTICS

Dr. Maxwell, as Chairman of the Research Council of the Chinese Medical Association, has continued the work on special surveys which was begun in association with Dr. Gear, and the report of this work was submitted to the C.M.A. Conference held in April of this year.

In the case of leprosy, 1,400 cards were received, giving epidemiological data, and further returns are still coming in. This gives a mass of material in regard to age, sex, site and time of incidence of disease, which will prove an excellent basis for such studies in this country. In addition to the work of this special survey, Dr. Maxwell has continued his own study of the distribution of leprosy in China, with increasingly satisfactory results. The advantage of this work is that every new fact obtained is of permanent value, and while these facts still resemble to some extent a jig-saw puzzle, they begin to fit into place in a way that should finally give a complete view of the whole.

Dr. Maxwell had the honour in the course of the year to be invited by the Canton Government to become its official adviser in leprosy.

In view of the very urgent need for a text-book on leprosy in the English language, Dr. Maxwell has given a good deal of time to this, with the result that the book was published during the first week of this year. The very extraordinary fact is that there is no text-book on this subject in English, giving information of later developments in treatment and pathology and the only books of this nature are out of print or obtainable only with great difficulty.

In this connection, Dr. Maxwell desires to express his thanks to his colleagues in the Institute for their generous assistance in the preparation of this text-book, a task made more difficult by the striking absence of such books, as already mentioned. Especially are these thanks due to Mr. Dent for his help with many of the illustrations, to Dr. L. S. Kau for histological sections for use as illustrations, and to Dr. Bernard Read for his help with a chapter on dietetics. The securing of the histological sections and the interpretation to be put on them has led the way into new fields. The sections have by no means corresponded with the usually accepted ideas of the morbid histology of leper eruptions. The comparatively new designation of tuberculoid eruptions in leprosy has bulked very largely in the picture which this study has given us, and both here and in India the question is being raised whether this appearance is not rather an unrecognized stage in the development of the ordinary cutaneous manifestations than a separate type of eruption.

At the request of several of the leading Chinese doctors, this text-book has been translated into Chinese and will be published in that language also in due course. Dr. Maxwell's assistant, Mr. S. A. Waung has undertaken the translation work.

During the year 1936, further reports have been published by Dr. Gear on the returns which were made during the General Survey of 1933 and 1934. In a paper on Scarlet Fever, Dr. Gear reports :—

(1) That scarlet fever has a wide distribution in China.

(2) That the relative incidence and severity of the disease increases on proceeding from South to North with the exception of Yunnan.

(3) That the seasonal incidence in the present sample differs from that of Europe and America in that the greatest number of cases occurred in the Spring.

(4) The slightly higher incidence in males cannot be considered significant.

(5) The age distribution is of some interest in that the male peak occurred in the age group 15-24 years, and the female peak in the age group 5-15 years, suggesting that in China Scarlet Fever is largely a disease of adolescence.

There has been a growing recognition that statistical method plays an essential rôle in certain phases of Medical Research. The Institute has not neglected this aspect and the Department of Medical Statistics has been organized to provide a statistical service for divisional workers. This has involved a certain reorganization and during the greater part of the current year the personnel has been trained in methods of computation and in the methods of statistics generally. Nor has the mathematical background been neglected. A course of lectures in higher algebra and in the differential calculus has been given, while an examination of the staff at the end of the year yielded gratifying results. In subsequent years courses will be given in those branches of mathematics necessary for the understanding of the logical ideas upon which statistical methods rest. Naturally little of this routine analysis will appear in print as a separate publication. It is, however, pleasing to note that workers are availing themselves of this service.

J. L. Maxwell:
"The Fight Against Leprosy" *Chin. Med. J.*, 1936, **50,** pp. 742-743.

J. L. Maxwell:
"Geographical Distribution of Vesical Calculus in China" *Chin. Med. J.*, 1936, pp. 827-828.

J. L. Maxwell:
"Leprosy: A Practical Text-book for use in China" Shanghai, 1937, p. 109.

J. L. Maxwell:
"The Need for a Clinical Journal." *J. Clin. Med.*, 1936, **1,** pp. 5-6.

J. L. Maxwell:
"The Task Before Us." *Chin. Med. J.*, 1936, **50,** pp. 716-720, and *Leper Quart.*, 1936, **10,** pp. 41-47.

H. S. Gear:
"Disease Incidence in China." *Chin. Med. J.*, 1936, **50,** pp. 949-972.

H. S. Gear:
"Epidemiological Notes on Scarlet Fever in China." *Chin. Med. J.*, **51,** pp. 203-210.

H. S. Gear:
"The Study of Disease Prevalance in China." *Trans. R. Soc. Trop. Med. Hyg.*, 1936, **29,** pp. 679-689.

E. A. G. Shrimpton:
Statistical Note—"Relation between degrees of Vitamin B_1 deficiency and the amounts of bisulphite-binding substances in the blood." *Quart. J. of Med.* 1936, **5,** pp. 371-373.

LIBRARY

Dr. Maxwell has continued to act as Librarian during 1936, but with a view to his retirement, more responsibility has been placed on Mr. Edmund Chen, to whom I am indebted for the details of this Report. Having regard to its position in a medical research institute, the Library is being developed along lines to meet the special needs of research workers. More emphasis is, therefore, placed upon journals and bibliographies. During the year considerable progress has been made in this direction, 88 journals having now been completed by the purchase of back numbers. Among these completed sets may be mentioned: British Medical Journal; Nature; Chinese Medical Journal; Biochemical Journal; Journal of Pharmacology and Experimental Therapeutics; Journal of Pathology and Bacteriology; Journal of Parasitology. Among the important journals still requiring completion may be mentioned: Journal of Physiology; American Journal of Physiology; Journal of Biological Chemistry; Archives of Internal Medicine; Journal of Infectious Diseases; Proceedings of the Royal Society (Biological Series); Lancet; and certain German periodicals. With regard to bibliographies, the Library has a complete set of the catalogue of the Library of the Surgeon-General's Office, U.S.A., and ten complete sets of abstracts including Chemical Abstracts and Physiological Abstracts.

Steady progress has been made in the general revision of the catalogue, including the preparation of an Author catalogue of books available in other medical libraries in Shanghai. Details in regard to additions to the library and other matters of a statistical nature are given in the Appendix, but the special gratitude of the Institute is due to the following institutions and persons, among others, for presentations to the Library: Aurora University; Baker Institute of Medical Research, Australia; Bureau for Increasing the Use of Quinine, Amsterdam; Calcutta School of Tropical Medicine; Calcutta School of Tropical Medicine and Carmichael Hospital for Tropical Diseases; Canadian Public Health Association, Toronto; Canton Municipal Bureau of Public Health; Central Field Health Station, Nanking; China Foundation for the Promotion of Education, Peiping; Chinese Chemical Society, Peiping; Chinese Pharmaceutical Association, Shanghai; Chinese Physiological Society, Peiping; Connecticut Agricultural Experimental Station, New Haven; D. H. Medical Journal, Shanghai; Division of Clinical Research and Experimental Surgery, H.L.I.; Division of Pathological Sciences, H.L.I; Division of Physiological Sciences, H.L.I; Federation de les Sociedades Medico-Cientificas del Uruguay; Fiji Islands, Medical Department; French Municipal Council, Shanghai; Geneeskundig Laboratorium, Batavia; Giza Memorial Ophthalmological Laboratory, Cairo; Hong Kong Medical Department; Hong Kong University, Medical Society; Indian Research Fund Association, Scientific Advisory Board; Kuala Lumpur Institute for Medical Research; Kwang-chi Hospital, Hangchow; London School of Hygiene and Tropical Medicine; Medical Research Society of China, Shanghai; Milbank Memorial Fund, New York; Moderne Diagnose und Therapie, Shanghai; Nankai Institute of Economics, Tientsin; National Medical College of Shanghai; National Research Council of Japan; National University of Peiping, College of Agriculture; National University of Peiping, College of Science; Neurological Institute of New York; New York, State Department of Health, Division of Laboratory and Research; North Borneo, Medical Department; Pasteur Institute, Indo-China; Peiping Union Medical College; Rockefeller Foundation, New York; Rockefeller Foundation, International Health Division; Rockefeller Institute for Medical Research; Royal Asiatic Society, Shanghai; Russian Medical Society of Shanghai; Shanghai Branch of the Chinese Medical Association; Shanghai Municipal Council, Public Health Department; Singapore, Registrar-General; Society of German Speaking Physicians, Shanghai; South African Institute for Medical Research; Tokyo Imperial University, Japan; Tung-Chi University, College of Medicine; Union of South Africa, Department of Agriculture; Wei Sheng Shu, National Quarantine Service, China; Mr. R. V. Dent; Drs. Douglas Guthrie, Edinburgh; C. D. de Langen, Batavia; J. L. Maxwell, B. E. Read; Prof. Shaw Tseng Hwang, Peiping; Drs. W. F. Theunissen, F. H. Oliveir, W. K. Mertens, Batavia; C. Tsai.

It will be noted from the figures given in the Appendix, that the Library is expanding in all directions, though, for reasons already given, the number of books as opposed to journals, remains relatively small. The figure for visitors does not include the departmental library which is housed in the Clinical Unit at the Lester Chinese Hospital. Considerable use is made of this library, which contains a large number of books on permanent loan from the central library.

DIVISION OF CLINICAL RESEARCH AND EXPERIMENTAL SURGERY

Dr. H. Gordon Thompson

The work in this Division of the Institute during the year under review has been varied to suit the particular lines of research that have been followed, the clinical material and the staff which has been available. The absence of Dr. John Gray, on leave, necessitated a contraction of work in the Department of Experimental Surgery, but it is satisfactory to note that during his leave he was awarded the Raymond Horton-Smith prize for the best thesis submitted for the M.D. (Cantab) degree, and that this was based upon work done in the wards and laboratories of the Institute. An expansion of the work of the Division has taken place in the Department of Medicine under Dr. B. S. Platt in two directions, and in both cases it takes the form of a co-operative effort. In the first place, in co-operation with Professor W. Y. Swen and Professor Buck of the Agricultural Department of the University of Nanking, a beginning has been made of a study of rural diets and their connection with deficiency diseases. This has been undertaken in a section of village population near to Nanking. In the second place, in co-operation with the Shanghai Municipal Council, Industrial Health Section, a diet kitchen for a group of factory workers has been opened for the direct study of deficiency diseases in a group of factory workers in Shanghai. A contrast is thus being obtained and observations made, upon the incidence of disease in three groups of individuals (*a*) Rural, (*b*) City and (*c*) Hospital patients, the two former being for the most part young persons and the latter older people who have probably been subject to food deficiency and unhygienic conditions for a considerable number of years. Further reference will be made to this under the Department of Medicine.

Staff Changes and Notes

Dr. S. Y. Gin has left us to take charge of the department of Pediatrics at Changchow Hospital and is continuing some observations upon infant feeding et cetera, begun in the Institute's Clinical Unit. Dr. Y. C. Yieh, who went to Liverpool University as the holder of a Holt travelling fellowship has concluded his special study abroad of Orthopedic Surgery and has been awarded the degree of M.Ch. (Orth). Dr. T. H. Li has been appointed Scholar in Medicine in place of Dr. S. Y. Gin. Miss M. Y. Dju has been appointed social visitor for the Clinical Unit, so that follow-up reports can be obtained of patients who have been in the research wards.

DEPARTMENT OF MEDICINE

For the purpose of a concise report it would appear to be difficult to avoid an artificial classification of the various activities of the Department of Medicine. A brief introduction will, therefore, be given in order to serve as an indication of the purpose behind the different activities which include laboratory, ward and field work, ranging from pure chemical investigations and animal experiments to clinical studies on human subjects, the latter including general observations on man, healthy or sick, his environment in city and in country, and, based on these observations, experimental attempts to prevent disease.

Lewis maintains that knowledge that is to be applied usefully to the health of mankind will almost always come by a series of steps, the first of which is the recognition of a human need, and the last, the application of a test directly to the human problem. Our observations indicate that in urban and in the poorer parts of rural China, there is a need for better nutrition of the human subject. In this sense, disease incidence as studied by conventional hospital survey methods is grossly misleading, since returns are based on diagnosis according to anatomical classifications or on ætiological grounds with reference particularly to some zymotic factor. Clinical characterization of disorders of nutrition may now be made more precisely than hitherto and defects in our knowledge of distribution of nutritional disorders may now be remedied.

The study of the development of the classical forms of diseases, such as beri-beri and scurvy has led to the recognition of the frequent occurrence of minor manifestations of such deficiency diseases and the fact that commonly, though not always, such deficiencies are multiple. It is certain from our knowledge of the diets of western people that, owing to ignorance, poverty or disease, such minor manifestations are likely to arise but are probably not widely recognized as such.

Problems of malnutrition in China are of special importance in that they are not generally capable of solution by direct application of formulæ derived from work in western countries. They, therefore, present a bigger problem than the control of zymotic diseases for which preventive measures are generally available for the public health worker.

Improvement of the nutrition of man involves much more than a study of the chemistry of his foodstuffs or even of the biological values of these foods for animals ; the tests must ultimately be made on man. The bases for such tests may be in part from the data of the science of nutrition and in part from the accumulated experience of civilization, a valuable source of information in China, though one to be used with judgment, for it is possible to preserve and reproduce life at sub-optimal levels of nutrition.

Furthermore, our investigations have shown that adequacy of a diet must be considered with reference to certain stresses ; these include infections, physiological processes, such as growth or pregnancy and environmental factors such as fatigue due to overwork, lack of rest, faulty hygiene and exercise, overcrowding and so forth.

Dietary Deficiency Diseases

Beri-beri and Vitamin B_1.—In 1935 we had only one patient with beri-beri of the fulminating and usually fatal type, which recovered on treatment with Vitamin B_1. During the past year, however, uniformly successful results have been obtained in the majority of such cases, largely owing to the use of much more active concentrates and, for more precise work, of a highly potent crystalline preparation of Vitamin B_1 kindly given to us by Dr. A. G. van Veen (Batavia). In the summer of 1935, we isolated pyruvic acid from the blood, urine and cerebro-spinal fluid of patients suffering from Vitamin B_1 deficiency and the quantitative estimation of this substance in body fluids has now been applied in nearly 200 different subjects. The results obtained have led to a much clearer understanding of some of the clinical features of Vitamin B_1 deficiency as it is encountered in practice.

The main results on the usually fatal cases are summarized in the accompanying table :

	No. of cases	*Pyruvic acid mg./100gm. (Blood).*	
		1 to 2 mg.	*2 to 4.5 mg.*
Total number of usually fatal acute cases of beri-beri admitted	26	—	—
Number of these uncomplicated by fevers	21	—	—
Number of these uncomplicated cases cured	17	6	11
Number of uncomplicated cases dead within 12 hours after commencement of treatment	4	1	3
Number of cases complicated with fever, dead within 10 hours after commencement of treatment... ...	5	5	0

The main conclusions which can be drawn from the work on the changes in pyruvic acid are as follows:

1. Maintained raised levels are, so far as we know, specifically associated with deficiency of vitamin B_1; the normal level in the blood is about 0.5 mg. per 100 gms. of blood.
2. Several hours are required for removal of accumulated pyruvic acid after administration of Vitamin B_1; one or two thousand international units (i.e. about 2-4 mg. of the purest crystalline vitamin) are needed in the acute cases to restore normal conditions with respect to pyruvic acid; this effect persists for several days depending on
   (*a*) the extent to which the patient was originally depleted,
   (*b*) the amount of rest he takes,
   (*c*) the calorie value of the diet subsequent to treatment,
   (*d*) the amount of vitamin in the food.
3. There is an increase in blood pyruvic acid following exercise in both normal and deficient subjects; the level in the normal rapidly returns to the initial value whilst in the deficient subject increased values are maintained or even further raised for some time after the exercise.
4. Increased intake of food without a correspondingly increased intake of Vitamin B_1 will also raise the level of blood pyruvic acid.
5. In the rapidly developing fulminatory types of beri-beri the initial level of pyruvic acid in the blood gives an indication of the degree of the deficiency.
6. Patients who have been resting for some time before investigation and who, on account of diminished appetite following hypovitaminosis B_1, have been taking food of low total calorie value present a different clinical syndrome from the more acute cases and the raised values for blood pyruvic acid are less marked.
7. These two groups of patients however appear to require similar amounts of vitamin to achieve a similar reserve with respect to their Vitamin B_1; this is measured by the response of the patient to an exercise tolerance test based on the observation recorded above.

Radiological studies of the heart and lungs have revealed a number of varying circulatory disturbances found under the operation of different ætiological factors, response to treatment, exercise and so forth. Our observations on the effect of Vitamin B_1 deficiency on the heart appears to afford grounds for considering as possibly due to Vitamin B_1 deficiency, increases in the size of the heart under physical stresses as in the so-called ‘ industrial ’ and ‘ athletic ’ heart. A striking feature in some cases of severe beri-beri is the development of a marked bradycardia after treatment with vitamin.

The changes in the cerebro-spinal fluid, previously reported, have been confirmed and considered in relation to a possible biochemical lesion in the nervous system underlying some of the clinical features of beri-beri.

The accumulation of pyruvic acid in association with other diseases and the value of vitamin therapy has been of assistance in the elucidation of such of these diseases as have been found to run unusual courses, especially perhaps in those in which there have been evidences of failure of the circulation and of polyneuritis.

The biochemical considerations put forward indicate in a very suggestive manner the possible inter-relationships between fatigue in its various aspects and diet, especially with reference to vitamin B_1 deficiency.

The more serious forms of Vitamin B_1 deficiency, in our experience, occur very rarely in women, except during pregnancy and lactation when increased need for vitamin, if not met, may give rise to subacute lesions similar to those seen in men. In a group of wet nurses, used in our work on infant feeding, it was found that the milk contains only small amounts of Vitamin B_1 and a dehydrogenase which is diminished in activity, an effect which appears in some manner to be linked up with the secretion of pyruvic acid in the milk.

Pyruvic acid is excreted in the urine by apparently healthy subjects, in increased amounts following bouts of exercise.

Work has been carried out on the composition of the diets for the development of bradycardia in rats used for the assay on Vitamin B_1 by the Harris technique. The lowered pulse rate is, in most cases, related to the accumulation of pyruvic acid in the blood of these animals. Normal values for pyruvic acid content of the blood may, however, be restored by giving Vitamin B_1 to rats which are moribund and continue to show a falling pulse rate.

The bradycardia method has been used for evaluating the vitamin content of foodstuffs. Its application to the assay of vitamin concentrates on the local market shows that in no case was one obtained which was more potent than an equivalent amount of *fresh* rice bran.

It has recently been reported that Vitamin B_1 will couple under certain conditions (not specified in the report) with diazotised p-amino-acetophenone ; this has been held to be specific for vitamin B_1. We have studied this reaction and have found conditions under which a purplish red solid is formed in such a way that the vitamin adsorbed on a suitable clay, reacts and may be extracted for colorimetric estimations.

B. S. Platt and G. D. Lu :

" Chemical and Clinical findings in Beri-beri with special reference to Vitamin B_1 deficiency." *Quart. J. Med.*, 1936, **5**, pp. 355-373.

G. D. Lu and B. S. Platt:

"The identification, estimation and excretion of pyruvic acid in the urine of apparently healthy individuals." *Chin. J. Physiol.* 1936, **10**, p. 663.

Vitamin C and Scurvy.—In the report, last year, gross unsaturation with respect to Vitamin C was recorded as a common finding in our beri-beri patients. Recent work from other sources indicates that the order of unsaturation we have found can be produced experimentally by feeding only 5 mg. daily of ascorbic acid for several weeks. This is in agreement with our estimates of the biological, as against the chemical values of Vitamin C in the usual Chinese diets. We have recently confirmed this by substitution of various preparations of vegetables for pure ascorbic acid in Vitamin C saturated subjects. It would appear to be unlikely that optimal amounts of Vitamin C are available in a diet containing an average amount of vegetables if these are the sole source of Vitamin C.

Classical scurvy is not frequently encountered in our hospital practice; it so happens that the cases we have had opportunity for careful investigation have been in middle aged women. Two such cases have been examined by feeding large doses of ascorbic acid; one of these, after about 7 gms. of ascorbic acid given over a period of two weeks, had a urinary excretion level of only about 100 mgs. daily. This patient had Schistosomiasis and was pregnant; the question is raised as to the effect of these conditions on absorption and utilization of Vitamin C.

E. F. Yang and B. S. Platt:

"Further observations on the supply and excretion of Vitamin C in man." *Chin. J. Physiol.* 1936, **10**, p. 665.

Pellagra and the Vitamin B_2 complex.—In the past year, two cases of undoubted pellagra have been studied. Rapid cure has been effected by the use of liver concentrate (Lilly 343) known to be rich in the anti-human pellagra component of the complex. As in the case of the other vitamin deficiencies, we are considering in pellagra the occurrence of minor grades. We are looking for some definite evidence, preferably chemical, of the effects of the absence of this food factor and for a pure source of the substance for treatment.

Vitamin A and Vitamin A deficiency.—In the Chinese diet, the main sources of Vitamin A are the carotenoid precursors in vegetables. These, we have studied in relation to the diets of our patients, and find that a probable explanation of the prevalence of deficiency of this food factor may, in part, be that the green vegetables in the city are frequently stale and contain greatly diminished amounts of Vitamin A precursors.

Measurements of the Vitamin A content of medicinal preparations, produced locally, prove these to be for the most part very inferior products.

The histopathology of the skin manifestations referred to in the last report shows a profusion of mitotic figures throughout the stratum spinosum of the epidermis in the stage of repair, a condition not seen in the fully developed follicular keratosis.

Infant Nutrition.—Following the principles laid down in a paper, quoted in the last report, we have been employing wet nurses to feed infants in the first few months. Owing to the nature of such investigations and certain administrative difficulties, this work is only slowly developing. Some observations on the milk of these wet nurses are mentioned above.

Whole rice, freshly de-husked, powdered to minimize losses in digestion, but retaining at the same time minerals and vitamins, has been used as the basis of a feeding formula for the weanling. Combined with soft bean curd, whole egg and a green vegetable soup, the latter prepared in such a way as to conserve its Vitamin C content, a mixture is obtained which has yielded good results in a number of cases when fed over periods of several months.

B. S. Platt:

> "An Approach to the Problems of Infant Nutrition in China." *Chin. Med. J.* 1936, **50,** pp. 410-424.

Extra-Mural Activities

In considering general developments in last year's report, reference was made to the need for observations on the subjects of our study in their own environments, urban and rural, and to the application of ward and laboratory findings to preventive measures in typical communities. Some progress may be reported along these lines.

By courtesy of Dr. Paul Hsü, Medical Officer of Health of Kiangninghsien, National Health Station, we have had an opportunity of studying the health of school children in a rural area. This examination has been possible only on clinical lines; it is hoped to be able to supplement such observations by the application of special laboratory methods in due course. It was interesting to find that the rare examples of definite vitamin deficiency met with, were found in the children of a family which was sufficiently well-to-do to afford to buy supposedly superior food from the city.

We have made some clinical observations on a village community which is being studied by the Agricultural Department of the University of Nanking, under the immediate direction of Professor W. Y. Swen, as a development of the land utilization studies of Professor J. Lossing Buck. Our studies are being extended, in the near future, with the help of special laboratory methods.

We have been able to investigate an outbreak of severe multiple nutritional deficiency disease, at the invitation of the authorities of the Soochow Government prison.

Dr. S. Y. Gin, who has taken up a post in Changchow in children's diseases and infant welfare work, is pursuing investigations under rural conditions.

The study of food deficiency diseases until recently has been mainly confined to hospital patients. Our more precise knowledge has, however, enabled us to accede with some assurance to a former request from the Industrial Section of the Shanghai Municipal Council for an investigation of the nutritional state of factory workers, especially of apprentices. It is certain however from our statistics that deficiency diseases in Shanghai affects a wide range of city dwellers and represents a general problem in the health of the Chinese subsisting mainly on rice bought in the city and on side dishes in which certain vegetables have lost much of their essential food factors in the course of transport and distribution. Superficially the diet in the city and the neighbouring country-side is the same, yet nutritional problems appear by contrast to be much more pronounced in the city.

For many reasons a hospital population cannot represent accurately the state of nutrition of a community as a whole; but investigation and detection of the earlier steps in malnutrition are more difficult to carry through in subjects still at work. In a survey completed in the past year in collaboration with the Industrial Section of the S.M.C., we have found in a total of nearly three thousand workers that one or more of certain signs of malnutrition may be present in all of the apprentices employed in some of the small factories. In many trades this statement holds good for half of the places investigated, whilst in the best of them, at least half of the younger employees are affected.

Diet Kitchen for Factory Workers.—On the basis of accumulated observations we have planned an experiment in which a group of artisans are to be fed under our direction for a period of one year. These workers are drawn from two factories from a group of eight similar factories working under like conditions in the vicinity, all the workers of which were examined clinically in 1936, and will be kept under observation during the experimental period. All the workers from one factory and a group from another factory engaged in the same occupation are being fed on the experimental diet, the remainder being fed on customary lines.

Attention will be paid not only to the composition of the diet but to factors likely to affect the value of the foods such as storage, transport, preparation, cooking methods, utilization of side products and so forth.

It is fully appreciated that 'environmental' factors, fatigue and so on, are likely to influence this attempt to improve the nutritional state; but these will form the subject of future studies.

The active co-operation of the Industrial Section of the Municipal Council has made this experiment possible.

We are also indebted for assistance through Dr. L. F. Chiao, to the National Rice and Wheat Improvement Institute, Nanking, for obtaining for us a standard strain of rice.

Miscellaneous.—As a preliminary investigation of the relation of nutritional factors to diseases of the chest, a report has been made on Bronchiectasis.

A statement of the present position in regard to the pH of blood as measured by the Glass Electrode has been made.

In preliminary work on the health of industrial workers, an investigation has been carried out on the lead and antimony hazards in certain trades. Processes and working conditions have been studied and clinical and laboratory examinations made for evidences of the toxic effects of these substances.

B. S. Platt:

> "The Elucidation of some Features of Non-tuberculous Bronchiectasis." *J. Clin. Med.*, 1936, **1,** pp. 164-172.

Department of Clinical and Experimental Surgery

Gastro Intestinal Disorders.

The experimental work upon the incidence of peptic ulcer, begun when Dr. P. T. Wu was on the staff of the Institute, has been collated and has shed further light upon the conditions responsible for the occurrence of this condition.

P. T. Wu and H. Gordon Thompson:

> "Observations on the Experimental Production of Peptic Ulcer in the Ileum." *Brit. J. Surg.*, 1936, **24,** pp. 183-187.

Reticulo-endothelial System

Additional experimental work has been done in connection with the lymphoid tissue of the body. It has been shown that a relationship exists between the bacterial flora of the alimentary tract, the lymphoid tissue and a deficiency diet, and that this is true not only for the vermiform appendix but also for the Peyer's patches and to a lesser degree for the tonsils. Moreover that the abdominal lymph nodes and the spleen show corresponding changes. This work is being continued.

H. Gordon Thompson:

> "The Spleen from the Clinical Point of View." *J. Clin. Med.*, 1936, **1,** pp. 207-215.

Urology

The investigation into the etiology of calculus disease of the urinary tract has been continued. It has been found that, with thorough clinical investigation, the preponderance of incidence in the lower urinary tract over that in the upper is not so great as has been supposed (rather less than 3 : 1). The distribution of the disease throughout China has been investigated by means of a questionaire sent to various hospitals in the interior, and combined data on the chemical, cytological and bacterial content of the stones made available, as well as some preliminary information as to the diet common in the stone prevalent areas.

A clinical and experimental investigation into the condition of urethral rupture and reasons for the common sequel of stricture has been undertaken, and an experimental investigation of the effect of hemisection of the kidney.

J. Gray:

> "Urinary stone formation, clinical and experimental." *Chin. Med. J.*, 1936, **50,** pp. 761-786.

J. Gray:

> "Stricture of the Urethra." *J. Clin. Med.*, 1936, **1,** pp. 114-123.

J. Gray :

> "Some observations on Experimental Renal Section." *Lancet*, **1,** 1936, pp. 359-362.

THE DIVISION OF PHYSIOLOGICAL SCIENCES

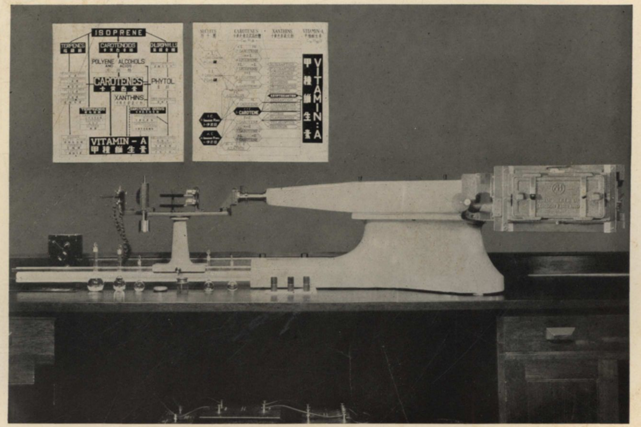
Professor Bernard E. Read

The work of this Division during 1936 has dealt chiefly with the basic facts concerning the nutrition of various groups in Shanghai. The report of the Technical Commission of the League of Nations Health Committee upon the " Physiological Bases of Nutrition " reflects the matured opinions of European workers in this field who have studied this problem together for more than a decade. The standards they have proposed refer to the needs of the European, the average requirements and provision for men of an average weight of 70 kilogrammes, living in a temperate climate with large resources of animal foods and a relatively high economic level. Different conditions prevailing in China and the countries of the Far East require many years of research upon food values, dietary habits, biological measurements, the relative adequacy of present nutrition, and the defining of states of malnutrition under existing conditions.

Lacking reliable statistics regarding actual supply, control and distribution of foods in China as a whole, and faced with rapidly changing social, political and economic conditions, it appears to be of more value to promote local studies where these factors can be better understood. The rapidly growing industries in Shanghai have brought in conditions revolutionizing the life and habits of the individual, of which one of the most important is his nutrition. The selection, transport, storage and special treatment of foodstuffs for use in modern city life produces a diet decidedly different from that of the agricultural community.

Nutrition

Continuing our dietary surveys, comparisons have been made between Shanghai Factory diets and those of Institutional workers. The latter show that the Chinese in well conducted institutions, in their intake of the dietary essentials, in no way fall short of the high standards laid down internationally as necessary for the well being of the individual, in fact many show a decided excess in the amount of food eaten. Evaluation of the diets of nearly one thousand individuals shows that the factory worker has a decidedly



Quartz Spectrophotometer for Vitamin A Estimations low standard in quality and quantity. There is an excessive intake of carbohydrate in all of the diets, producing an unbalanced and inefficient bulky diet. There is a very low intake of good animal fats and too little animal protein. The height-weight measurements of the factory workers, compared with measurements upon local students indicate a low state of nutrition, comparable to other races living on poor vegetarian diets.

B. E. Read, S. G. Hatem, Y. B. Dju, and W. Y. Lee :

> "Industrial Health in Shanghai, China. II. A study of the Chromium Plating and Polishing Trade." *Chin. Med. Ass., Special Report Series* No. 6, 1936.

W. Y. Lee, E. Reid, and B. E. Read :

> "Industrial Health in Shanghai, China. III. Shanghai Factory Diets compared with those of Institutional Workers." *Chin. Med. Ass., Special Report Series No.* 7, 1936.

B. E. Read :

> "Man's Protein Requirement." *J. Clin. Med.*, 1936, **1**, pp. 39-53.

VITAMINS

Dr. P. G. Mar has continued his chemical and spectrographic examination of Chinese foods with regard to their content of vitamin A and its precursors. In common with the workers in other countries, he has encountered many difficulties in satisfactorily interpreting the results obtained from recognized standard methods. Qualitatively his results suggest a number of good sources of this vitamin, which may be confirmed by further biological assay.

Dr. H. C. Hou in his studies upon the interrelationship of vitamins to other dietary constituents, found that the effect of avitaminosis A in producing urinary calculi was influenced to a great extent by varying the diet. A low content of inorganic calcium and phosphorus, and both a high and low casein content increased calculus formation. The addition of lard definitely lessened the incidence, and the occurrence of calculi ran parallel to the presence of infection or of severe changes in the kidney or bladder epithelium.

Considerable work has been undertaken upon vitamin C. Dr. Hou finds that Shanghai tap water has a definite destructive effect upon this vitamin, far greater than that caused by boiling in distilled water for fifteen minutes. This has a bearing upon the value of various pharmaceutical preparations of vitamin containing drugs. Dried orange peel is used extensively in modern and ancient medicine, hence a study was made of the vitamin C content of the peel and its preparations. Most of the market specimens of the dried material showed a moderate amount present. Whilst drying the peel causes a slow diminution of the ascorbic acid, the loss of moisture is more rapid so that during the first five days one obtains a product far richer in vitamin than the juice. Ascorbic acid was found most stable in 90 per cent alcohol, less so in 70 per cent, and least so in distilled water. Prolonged storage reduces the ascorbic acid content to a low level. The fresh preparations tested biologically gave high antiscorbutic values.

Dr. Hou further studied the mode of administration and the fixation of ascorbic acid by the tissues. Introduced into the colon by rectum it is inactive. Oral administration is only half as effective as subcutaneous injection. The tissues examined from scorbutic animals and those given a liberal supply of vitamin C show that the adrenal and muscle take up most of this vitamin, next the skin, then the intestine and kidney.

Biological assays of numerous citrus fruits and vegetables have been made; alfalfa, amaranth and capsicums are exceedingly active, giving values higher than those for orange juice. Further studies on the comparative values obtained by chemical and biological assay show that the citrus fruits give good agreement between these two methods, but alfalfa and some other vegetables have an interfering factor in absorption which results in a somewhat lower value in the biological assays. Cooked vegetables showed present in the soup a good amount of fully utilizable vitamin, more effective than that remaining in the cooked vegetable.

Mr. Lee studied the effect of light on germinating soybeans and found that there is about double the amount of vitamin produced by the fourteenth day, that this may be correlated to the time when chlorophyll is formed in the cotyledons and that this provides the growing sprouts with a high percentage of ascorbic acid up to the eighth day. The results are of considerable value in nutrition for various sprouted beans are used in Chinese diets.

H. C. Hou:

"The vitamin A content of Hunan La-chiao, *Capsicum annuum*, L. var *Longum*." *Chin. J. Physiol.*, 1936, **10**, pp. 171-178.

P. G. Mar and B. E. Read:

"Chemical examination of Chinese remedies for nightblindness." *Chin. J. Physiol.*, 1936, **10**, pp. 273-284.

H. C. Hou:

"The influence of diet on the formation of urinary calculi." *Chin. Med. J.*, 1936, **50**, pp. 787-796.

H. C. Hou :

"The relation of vitamin A to health and disease." *Chin. Med. J.*, 1936, **50,** pp. 1481-1492.

P. G. Mar :

"New sources of vitamin A." *Chin. Med. J.*, 1936, **50,** pp. 1086-1097.

P. G. Mar.

"Vitamin and pro-vitamin A contents of Chinese foods (A preliminary report)." *Chin. J. Physiol.*, 1936, **10,** p. 663.

H. C. Hou :

"Studies on the interrelationship of vitamins and other dietary constituents. II. Change of dietary constituents on the pathological effect of avitaminosis A." *Chin. J. Physiol.*, 1936, **10,** p. 659.

H. C. Hou :

"Vitamin C in nutrition in China." *Nutrition Notes*, 1936, No. 6.

H. C. Hou :

"The vitamin C content of Hunan La-chiao, *Capsicum annuum*, L. var. *Longum*." *Chin. J. Physiol.*, 1936, **10,** pp. 179-186.

H. C. Hou :

"The variation of vitamin C content in certain fruits and vegetables." *Chin. J. Physiol.*, 1936, **10,** pp. 221-236.

H. C. Hou :

"Further studies on the chemical and biological assay of vitamin C." H. C. Hou. *Chin. J. Physiol.*, 1936, **10,** pp. 191-198.

H. C. Hou :

"The relation between the antiscorbutic activity and the mode of administration of ascorbic acid." *Chin. J. Physiol.*, 1936, **10,** pp. 213-220.

W. Y. Lee :

"The formation and distribution of vitamin C in the germinating pea, *Pisum sativum*, L. (Blue bantam variety). *J. Chin. Chem. Soc.*, 1936, **4,** pp. 219-223.

H. C. Hou :

"Vitamin C and its relation to disease." *Chin. Med. J.*, 1936, **50,** pp. 536-553.

H. C. Hou :

"The destruction of ascorbic acid in water." *J. Chin. Chem. Soc.*, 1936, **4,** pp. 224-234.

H. C. Hou :

"Fixation of ascorbic acid by tissues." *Proc. Soc. Exper. Biol. N.Y.*, 1936, **34,** pp. 833-835.

H. C. Hou :

"Studies on the vitamin C content of orange peel and its pharmaceutical preparations." *Chin. Med. J.*, 1936, **50,** pp. 1227-1234.

W. Y. Lee and B. E. Read :

"The effect of light on the production and distribution of ascorbic acid in germinated soybeans." *J. Chin. Chem. Soc.*, 1936, **4,** pp. 208-218.

H. C. Hou :

"Studies on the biological and chemical assays of vitamin C in foods. III. Assay of cooked vegetable and its soup." *Chin. J. Physiol.*, 1936, **10,** pp. 659, and Proceedings p. 16.

H. C. Hou :

"Vitamin studies of Chinese citrus fruits and their commercial products." *Chin. J. Physiol.*, 1936, **10,** p. 660.

BIOCHEMISTRY

Dr. C. Tsai has continued his excellent researches upon carbohydrate metabolism. By the use of permanent angiostomy cannulæ he has been able to study sugar intake by the normal animal. In glucose-fed animals the glycogen content of the liver and muscles is much higher than in the controls. Estimations of the inflowing and outflowing blood of the liver give definite evidence of sugar intake by that organ, but muscle shows almost double the increase.

Further work using mixed diets showed that when the portal blood sugar reached a high enough level there was retention of sugar by the liver. After the normal period of digestion and absorption there is during the interdigestive interval liberation of sugar by the liver which far exceeds the amount originally retained. It is concluded that the liver during this period forms large quantities of sugar from non-carbohydrate sources.

Dr. T. G. Ni has studied the creatine metabolism of animals with nutritional muscular dystrophy and found that the creatine content of the muscle falls to a low level. The early clinical symptoms of paralysis were found to occur after a significant rise of the creatine coefficient and an appreciable fall of the creatinine coefficient. The use of glycine for muscular dystrophy led to a study of this substance on the neuro-muscular system of the guinea-pig. Definite toxic symptoms showed that glycine is not well tolerated by this animal; there developed a lack of tone in the skeletal muscles, and high dosage is fatal.

Mr. W. Y. Lee in continuing his studies upon the metabolism of germinated soybeans investigated the distribution of phosphorus in the cotyledons and growing embryo. Two-thirds of the lipoid phosphorus disappears within the first three days of germination. In fifteen days one-third of the phosphorus in the cotyledons was transferred to the embryo for the development of the root, stem and leaves. The total phosphorus and the acid soluble phosphate showed little variation, other changes were related to the different stages of development of the seedling.

C. Tsai and C. L. Yi:

"Carbohydrate metabolism of the liver. V. Sugar intake in the normal intact cat during glucose absorption." *Chin. J. Physiol.*, 1936, **10**, pp. 87-104.

C. Tsai and C. L. Yi:

"Carbohydrate metabolism of the liver. VI. Sugar output and intake in the daily digestive and non-digestive cycle." *Chin. J. Physiol.*, 1936, **10**, pp. 105-118.

C. Tsai:

"The nature of combined glycogen in the liver and muscle." *Chin. J. Physiol.*, 1936, **10**, *Proceedings* p. 29.

T. G. Ni:

"The creatine-creatinine excretion and the creatine content of muscle in nutritional muscular dystrophy." *Chin. J. Physiol.*, 1936, **10**, pp. 199-206.

T. G. Ni:

"Effect of glycine on the neuro-muscular system." *Chin. J. Physiol.*, 1936, **10**, p. 664, and Proceedings p. 26.

W. Y. Lee and H. L. Li:

"Distribution of phosphorus in germinating soybeans." *Chin. J. Physiol.*, 1936, **10**, pp. 661-662.

PHARMACOLOGY

(*a*) *Materia medica.*

With the publication of the third edition of "Chinese Medicinal Plants" there has been set up a comprehensive reference list to all of the scientific work done upon the identity, chemistry and physiological action of Chinese drugs. Recent discoveries regarding vitamins, hormone and glandular extracts have provided a fresh approach to ancient medicine with a possible new evaluation of some of the old empirical methods.

B. E. Read:

"Chinese Medicinal Plants." Third edition. *Peking Nat. Hist. Bull.*, 1936, p. 389.

B. E. Read and C. Pak:

"Minerals and Stones." Second edition. *Peking Nat. Hist. Bull.*, 1936, p. 98.

B. E. Read:

" The newer Pharmacology and its relationship to ancient medicine II." *Peking Nat. Hist. Bull*, 1936, **10**, pp. 309-318.

B. E. Read:

" Notes on the history and treatment of urinary calculi in China." *Chin. Med. J.*, 1936, **50**, pp. 847-848.

(*b*) *Standardization.*

Dr. Pak, during his visit to the National Research Institute at Hampstead, participated in the evaluation of the new International Standard for Insulin adopted by the League of Nations. The need for biological standardization of drugs used in China is very great. This was presented by Dr. Pak in his Institute lecture, and it is hoped that we may be able to help forward this fundamental subject.

H. P. Marks and C. Pak:

" Evaluation of the new International Standard Insulin by the rabbit and mouse methods of assay." *Quart. Bull., Health. Org., L. O. N.*, 1936, **5**, pp. 631-651.

(*c*) *Drug action.*

Dr. Ni has shown that Ah-chiao (a glue made from donkey skin) is effective in stopping threatened circulatory failure. It is a readily available substance throughout China, and gives better results than gum acacia.

Ah-chiao in the treatment of nutritional muscular dystrophy in guinea pigs caused partial or complete disappearance of the symptoms. The progressive improvement was studied clinically and histologically. It was successful when used as a prophylactic, the animals remaining healthy and active, and histologically the muscle fibres were normal.

T. G. Ni:

" The use of Ah-chiao (donkey skin glue) for circulatory failure encountered in severe hemorrhage and shock." *Chin. J. Physiol.*, 1936, **10**, pp. 125-134.

T. G. Ni:

" The effect of donkey skin gelatin (Ah-chiao) upon nutritional progressive muscular dystrophy." *Chin. J. Physiol.*, 1936, **10**, pp. 237-248.

Ephedrine.—Comparative studies of the actions of ephedrine and methyl-ephedrine showed that the latter compound has a strong broncho-dilator effect independent of the blood-pressor activity. This fact, together with a consideration of its systemic effects and lower toxicity, suggest that methyl-ephedrine may have decided advantages over ephedrine in the treatment of asthma.

C. Pak and B. E. Read :

"The comparative action of methyl-ephedrine and ephedrine. Part I. Systemic effects." *Quart. J. Pharm.*, 1936, **9**, pp. 235-255.

C. Pak and B. E. Read :

"The comparative action of methyl-ephedrine and ephedrine. Part II. The bronchial effects." *Quart. J. Pharm.*, 1936, **9**, pp. 256-267.

New antipyrine derivative.—Drs. Chi and Yang of Academia Sinica recently synthesized a new antipyrine compound, 1 phenyl-2-methyl-4-ethyl-pyrazol-5-one, which Dr. C. L. Yi has found to be more potent and more rapid in its action than antipyrine.

C. L. Yi and B. E. Read :

"The antipyretic action of a new antipyrine derivative." *Chin. J. Physiol.*, 1936, **10**, pp. 297-302.

Propyl-guaiacol.—The anthelmintic and toxic effects of propyl-guaiacol were studied in dogs and cats. It is an active anthelmintic for ascaris but has no effect on tape-worms, hook-worms or flukes. It irritates the alimentary canal and is comparatively toxic to the host, causing marked depression of the central nervous system and circulation.

C. Pak and B. E. Read :

"The anthelmintic action of propyl-guaiacol." *Chin. J. Physiol.*, 1936, **10**, pp. 249-258.

(*d*) *Toxicology*.

The late Dr. Eric Reid started a programme of work upon fluorine toxicosis. The fluorine content of various foods has been studied. Leaves in general were found to assimilate more fluorine than roots or seeds. There was little evidence that plants assimilate more fluorine from soil rich in fluorine such as exists in this province. Samples of water from areas where mottled teeth occur have been found to contain toxic quantities of fluorine. Animal experiments to elucidate this problem have been elaborated, and the results will be published in future reports.

E. Reid :

"The fluorine content of some Chinese food materials." *Chin. J. Physiol.*, 1936, **10**, pp. 259-272.

STAFF CHANGES

At the end of 1936 Dr. Chiao Tsai went to Nanking to join the medical faculty of the National Central University as Professor of Physiology. The excellent textbooks in Chinese published by him in recent years indicate the keen interest he has sustained in educational work for which he is well qualified. The results of Dr. Tsai's four and a half years research at this Institute are receiving recognition in foreign textbooks. We miss his good fellowship in our midst.

In midsummer Mr. R. G. Cheng, who came to us as a scholar to undertake food analysis, resigned to join a manufacturing chemist in Nanking. Mr. Cheng's progress in chemical analysis enabled him to take over and satisfactorily complete Dr. Eric Reid's fluoride work.

The annual award of a Holt travelling fellowship enabled Mr. W. Y. Lee to take up work as a research student at the London School of Hygiene and Tropical Medicine, from which he returns in the midsummer of this year.

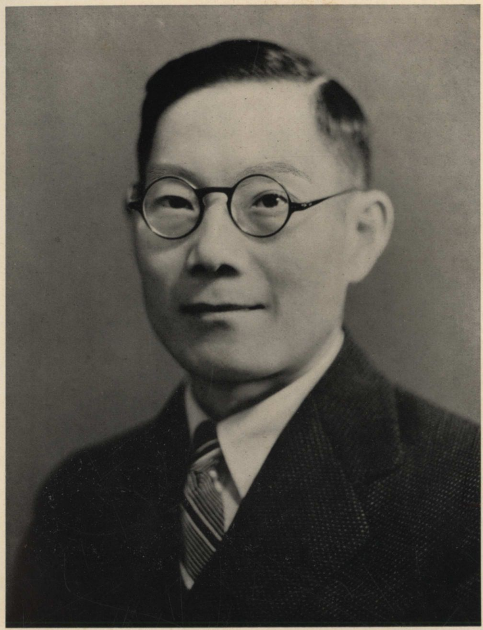
It has been a pleasure to have with us, Mr. H. L. Li, a scholar from West China Union University. Mr. Li has co-operated with Dr. Pak in the chemical extraction of certain Chinese drugs being tested for their physiological activity.

During the absence of the Head of the Division on long leave the work of the Division did not stand still as evidenced by the large number of publications.

SERVICES

The technicians' training class this year was led by Dr. Peter G. Mar, who gave a series of weekly lectures upon the chemistry of food and nutrition, such naturally dealing with the elementary principles and the technical methods required for their study.

The workshops have continued to render good service under the direction of Mr. G. Blow, supplying all our special needs in wood, glass and metal work. We are indebted to other divisions for the sectioning of tissues, photography, X-rays and the use of the animal operating theatre.



Dr. Chiao Tsai

DIVISION OF PATHOLOGICAL SCIENCES

Dr. R. Cecil Robertson

The title " Pathological Sciences " is a convenient designation under which we group and include a number of allied research activities in various fields of work, namely :

(1) Bacteriology and Virus Diseases
(2) Immunology and Serology
(3) Tissue Pathology
(4) Protozoology and Helminthology
(5) Medical Entomology

Certain of our problems have been undertaken by the staff in more than one section. It has been our aim to co-ordinate such work so that the team spirit in research is fostered as far as possible.

During 1936, the staff has remained practically unchanged. Mr. H. Ling's scholarship terminated on February 28th, 1936.

Dr. F. F. Tang returned from his year's study leave in Great Britain on October 15th. His work at the National Research Institute, Hampstead, is commented upon under the Section Bacteriology and Virus Diseases.

We have continued the various lines of investigation commented upon in the Annual Report for 1935, and taken up one or two new lines of work.

A recrudescence of Relapsing Fever during the spring and early summer enabled us to study this disease further from various angles, chiefly the morphology of the spirochæta recurrentis and an intensive enquiry into the vector problem. An interesting field study on Schistosomiasis in Fukien culminated in clearing up the question of the endemic nature of this disease in that province.

The details of the various investigations are summarized under the various sub-headings.

(1) Bacteriology and Virus Diseases

Typhoid Fever

The work done on the newly discovered " Vi " antigenic factor of *B. typhosus* was continued. It is of interest to note that of the seventy-six local strains of this organism which were isolated from typical cases of typhoid fever in Shanghai, only three were found to be devoid of " Vi " antigen. We are still inclined to regard the " Vi " antigenic factor as not being primarily connected with the virulence of typhoid bacilli or even with the so-called " O " antibody resistant properities of the organism. Recent experiments confirm our original view that " Vi " antibody or the response to " Vi " antigen in the tissues of animals is a protective substance. Experiments with mice clearly show the induction of passive immunity by means of " Vi " antibody.

Dr. H. Yu has been studying the leucopenia which is a characteristic feature of typhoid fever. He finds the transitory leucopenia in the peripheral blood of rabbits following the inoculation of *B. typhosus* toxic substances is due to the temporary accumulation of neutrophils in the reticulo-endothelial organs. We deduce from this that the phenomenon of leucopenia in the typhoid fever of man is due to the constant liberation of *B. typhosus* toxic substances in the circulation during the course of the disease.

Cholera

Dr. H. Yu studied the antigenic components of *Vibrio choleræ* and discovered an antigen of the " Vi " type to be present. It was found that there is no correlation between virulence and " Vi " antigen in *V. choleræ*. Furthermore the " Vi " strains of *V. choleræ* do not produce better immunity than strains which are devoid of " Vi " antigen. This would indicate that the protective action of V. choleræ depends on its smooth " O " antibody and the presence or absence of " Vi " antigen is of no significance in immunity production.

The work on water vibrios which Dr. Pollitzer, microbiologist of the National Quarantine Service, had been carrying out in conjunction with us was discontinued during 1936.

The absence of epidemic cholera from the city and neighbouring provinces naturally brought an end to research on freshly isolated cultures and also to factors connected with cholera like organisms found in surface waters.

Summer Diarrhœas (*B. morgan No. 1*)

Dr. H. Wei has made a short study on a series of cultures of *B. morgan* No. 1 found in the stools of cases of choleraic diarrhœa or pseudo dysentery. The prevalence of this organism of doubtful pathogenicity is very remarkable in such cases.

Serological investigation of the cultures and the cross agglutination test leads Dr. Wei to classify *B. morgan* No. 1 in the Proteus group of micro-organisms.

Relapsing Fever (*Spirochætes*)

Dr. Wei was able to complete a new and original series of observations on the morphology of *Spirochæta recurrentis*. The mechanism of reproduction of this organism has been elucidated by means of continued dark background observations confirmed by high power photo-micrography. It is clear that this spirochæte has an axial filament. It divides by transverse fission but the ends are linked by an exposed portion of this spiral shaped filament which is rigid and firm.

A hitherto unrecorded phenomenon was noticed in that when the spirochætes were linked in the above-mentioned manner most of them became rounded at the ends, the axial filament splitting gradually away from the body of the spirochæte during the course of separation. Apparently when fission is complete old axial filaments are discarded.

Comparative studies in the morphology of the *Sp. recurrentis* (louse borne relapsing fever) and *Sp. duttoni*, the cause of African relapsing fever (tick borne) were made. *Sp. duttoni* has similar reproductive features, only differing in minor details.

The susceptibility of different strains of mice to infection with the disease received study. The cultivation of the spirochæte in developing chick embryo has met with success. A new field of work in spirochæte cultivation seems to be indicated by this work.

Experiments with regard to the transmission of relapsing fever spirochætes by various vectors are discussed under Entomology.

VIRUS DISEASES

Virus research has now become of first rank importance in Human Pathology since greater advances have been made during the last three years than in any period since Jenner and Pasteur laid the foundation for virus study by their work on variola and rabies respectively.

Modern concepts of virus study have been completely revolutionized through the work of Laidlaw, Andrewes and Elford at the National Research Institute, Hampstead. Improved devices for measuring the actual size of viruses by means of gradocol membranes have been devised by Elford and his associates.

Important human diseases, such as influenza, have had their ætiology cleared up. Facts as to the susceptibilities of various animals have received close investigation and the immunizing effect of viruses used in certain ways has opened up a new outlook in Immunology.

In this Institute we have taken some part in modern virus study in connection with Dr. F. F. Tang's work. During 1935-6, he spent a year at the National Research Institute, Hampstead, and has become familiar with the most recent developments in the technique of virus work.

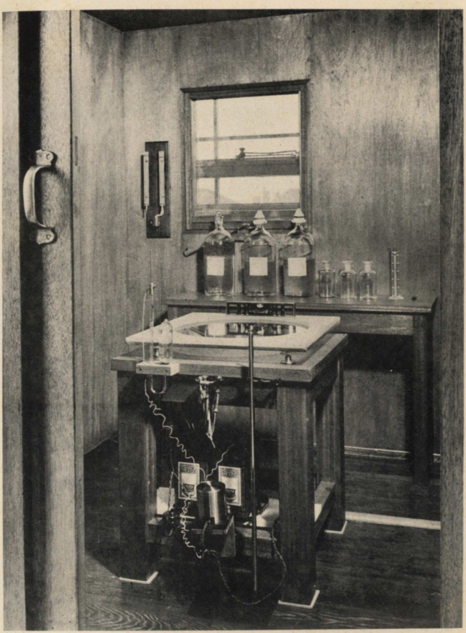
Dr. F. F. Tang made a series of studies at Hampstead on the sizes of the viruses of human and swine influenza as determined by ultrafiltration.

In continuation of previous work done here on the photodynamic action of methylene blue, Dr. Tang conducted experiments on the immunizing value of equine encephalomyelitis virus subjected to the photodynamic action of methylene blue. The results of this work were communicated to the Virus Section of the International Congress of Microbiology in London 1936, in which Dr. Tang represented the Chinese Government and the Chinese Society of Pathology and Microbiology as one of the three official delegates.

Ultrafiltration and ultracentrifugation studies were carried out with virus of equine encephalomyelitis and megatherium bacteriophage by Dr. Tang in conjunction with Drs. Galloway and Elford.

In an attempt to see whether mice could be made hyper-susceptible to the virus of influenza so that direct transference of the virus from human source may be possible, a good number of experiments have been undertaken by trying to decrease the resistance of the animal with injurious substances such as benzol or by X-ray irradiation. Again, attempts to increase the virulence of the virus by means of testicular extract were made. The X-ray work was done in conjunction with Dr. Stuart-Harris and Dr. Dunken White, radiologist of the Post Graduate School, Hammersmith, London. The results of all these experiments do not support the original concept of this investigation but they illustrate well the difference between bacterial and virus infections in the process of infection and resistance.

We owe to Sir Henry Dale, Sir Patrick Laidlaw, Drs. I. A. Galloway, W. J. Elford, C. H. Andrewes and other members of the National Institute a deep debt of gratitude for their courtesies shown to Dr. Tang during his stay with them.



Constant Temperature Cabinet for Preparation of Gradocol Membranes in Virus Study

In this Institute, in conjunction with Dr. Wei, a study was made on the cultivation of the viruses of vaccinia and herpes in the developing egg. This study was initiated by a previous investigation on the causal agent of pleuropneumonia, the developmental stages of which led us to enquire whether the same phenomenon could be observed with typical viruses, such as vaccine or herpes virus. The viruses were grown on the chorio-allantoic membrane of chicks and small portions of the infected tissue or scrapings made from it were studied under the microscope in the fresh state with or without supravital staining. Also sections and smears prepared from scrapings were examined after staining with simple eosin and methylene blue and Giemsa stains. After a considerable number of experiments it is concluded that developmental forms such as coccoids, bacillary bodies and chains could be seen within the infected ectodermal squamous cells with vaccinia, but not in the case of herpes cultivation.

Since the return of Dr. Tang to this Institute in the middle of October, many preparations are being made in the way of equipping our laboratories with the latest means of studying viruses and projects have been made for an intensive study on epidemic influenza and trachoma.

M. Y. Dzen and H. Yu :

" The Optimum Dosage of Prophylactic Cholera Vaccine." *Chin. Med. J.*, 1936, Suppl. I, pp. 198-201.

R. C. Robertson :

" Typhus Fever." *J. Clin. Med.*, 1936, **1**, pp. 96-113.

W. J. Elford, C. H. Andrewes and F. F. Tang :

" The Sizes of the Viruses of Human and Swine Influenza as Determined by Ultrafiltration." *Brit. J. Exp. Path.*, 1936, **17**, pp. 51-53.

S. D. Du :

" Simple and Rapid Methods of Staining *Treponema Pallidum*." *Chin. Med. J.*, 1936, **50**, pp. 1283-1285.

(2) Immunology and Serology

The New Anti-typhoid Serum

During the year under review, further progress was made in estimating the value of the new curative serum for typhoid fever. A further thirty-two typhoid patients were treated during the year. This brought the total number of experimental cases up to fifty-six. Of this number thirty-two patients were definitely improved, following upon the administration of the serum as evidenced by a fall in the fever and a decrease in toxic symptoms. Eight further cases showed reduction in toxæmia but no noticeable effect on the temperature curve.

The results of these trials were reported in the *British Medical Journal*, after our findings had been discussed with Dr. A. Felix at the Lister Institute in London.

We have, in agreement with Dr. Felix, adopted certain criteria of potency for the new serum based on the " O " agglutinin content and the presence in sufficient titre of " Vi " antibody.

Our technique and methods of production have now been placed at the disposal of the National Epidemic Prevention Bureau, Nanking, under the supervision of Dr. Edgar Tsen. We look forward to more extensive use of anti-typhoid serum in the future as a means of alleviating the disease.

Anti-typhoid Vaccine

Research work within recent years is bringing out more clearly the nature of the antigenic properties of various strains of *B. typhosus*, and it is very probable that improvements in the prophylactic vaccine can be anticipated, due to this improved knowledge. The protection stimulating factor seems to be associated with the " Vi " antigen. It is of interest to note that our standard *B. typhosus* Rawlings, which has for so long been used in typhoid vaccine preparation contains " Vi " antigen, but not to the extent that we have demonstrated in certain local strains recently isolated from patients in Shanghai.

Complement Fixation Tests

Work in Serology has been directed chiefly to sero-diagnosis for various hospitals. Tables explaining the extent of this will be found in the appendix. Research work in complement fixation tests has been continued in connection with certain helminthic diseases. This work is an attempt to investigate further the immunological phenomena associated with certain Trematode infections. We are attempting to find out if these infections produce positive complement fixation in a specific sense for each particular parasite, or if we are dealing with a group reaction common to all Trematode infections.

Various antigens have been tested out and comparative data obtained with the use of adult worm antigen and cercarial antigen. The most specific of the Trematode infections so far worked upon is

Schistosomiasis. Fasciolopsiasis and Paragonimiasis have, so far, yielded very inconclusive results.

Precipitin Tests

This test has been applied in connection with the blood meals partaken of by anopheline mosquitoes. 480 of these tests were performed in connection with an investigation on the zoophilic tendency of Anopheles hyrcanus sinensis. This matter is discussed under Entomology and has formed a continuous line of investigation for the last three years.

Agglutination Tests

These were extensively applied for the identification of various micro-organisms.

The Widal Test

The statistical figures for this test appear in the appendix.

The Weil-Felix Test

This test has been applied to a number of suspected Typhus fever cases. Our view is that the test does not always yield highly positive results until the disease is well advanced. Sometimes a positive Weil-Felix test is only obtained when the patient is approaching convalescence.

Vitamin C in Infection and Immunity

Dr. H. Yu's work shows that B. typhosus is very sensitive to vitamin C. When 1 c.c. of saline emulsion of B. typhosus is mixed with 1 c.c. of 2 milligramme per cent neutralized vitamin C, all the organisms are killed after standing at room temperature for one hour. In rabbits, fed on a normal diet, immunization with typhoid vaccine combined with vitamin C brings out no increased response as measured by agglutinin titre or bactericidal power, the results being similar in the control animals immunized with typhoid vaccine alone. When vitamin C and typhoid vaccine are given separately in vivo, there is also no difference in protective power. The use of vitamin C as a prophylactic agent or in therapy seems, however, to be indicated on theoretical grounds for certain bacterial infections.

R. C. Robertson and H. Yu:

"The " Vi " Antigen of *B. typhosus*." *J. Path. Bact.*, 1936, **43**, pp. 191-196.

R. C. Robertson and H. Yu:

"The Serum Treatment of Typhoid Fever." *Brit. Med. J.*, II, 1936, pp. 1138-1140.

H. Yu:

"Serum Therapy of Infectious Diseases." *J. Clin. Med.*, 1936, **1**, pp. 221-240.

H. Yu:

"The Serum Treatment of Typhoid Fever" (*in Chinese*). *Natl. Med. Jour.*, 1936, **22**, p. 623.

(3) TISSUE PATHOLOGY

The amount of section cutting and histological diagnosis performed in this department remains at about the same volume as in 1935. As commented upon in previous reports, this Institute is regarded by a large number of hospitals in China as a place where histological diagnosis can be obtained in difficult cases of tissue pathology, especially when malignant or neoplastic growths are suspected. We have been constrained to issue the following statement to those sending in tissue specimens.

(1) In accordance with the procedure followed by all recognized research institutions, this Division will be glad to undertake and give the necessary assistance in the examination of biopsies and rare tumours which are of real interest to medical research.

(2) The Pathological Laboratory will naturally assume full possession of all such material, whether of the nature of biopsy or autopsy specimens.

(3) Due acknowledgment must be given whenever our pathological findings are included in any publications and the same will be reciprocated.

As to methods of handling tissues, etc., have all the specimens fixed AT ONCE in Formalin Solution 10 per cent (ten per cent) thoroughly, before sending to the laboratory. The specimens should not be more than 4mm thick if a thorough fixation is required.

When sending specimens through parcel post, always put them into WIDE MOUTH jars in order to facilitate their easy removal. Many valuable specimens have been ruined by forcing them into narrow mouth jars where they must be broken, or the tissues cut to pieces at the time of their removal. Next, always give the necessary clinical data of every case when sending specimens. A blank is furnished for your guidance.

Generally speaking it is the policy of the Institute not to conduct a diagnostic service as such. Facilities exist for this type of service in the laboratories conducted by the three Municipalities and certain private laboratories in Shanghai.

Our criterion of interest is whether the material for examination is of a definite research nature, and forms part of the programme of one of our associates in Pathology.

The Tissue Pathology Laboratory received, in 1936, from various sources in China a total of 1,589 tissue specimens. During that period there were 2,253 paraffin blocks prepared, and from these approximately 6,759 slides were prepared; this shows an average of about three slides made from each paraffin block. There were many blocks cut of cases from previous years, also a large number of slides stained from old cases which have been included in the above report.

The largest number of specimens received in one single month was in January, when a total of 191 specimens were recorded and the minimum was in July, when only 72 specimens were entered in the records.

The undermentioned hospitals, outside of Shanghai, have availed themselves of section cutting and histological diagnosis during 1936 :

Amoy, Hope Hospital	15
Changchow, Changchow General Hospital	9
Chinkiang, Goldsby King Memorial Hospital	27
Foochow, Fukien, Foochow Christian Union Hospital	97
Hangchow, C.M.S. Hospital	2
Hinghwa, Fukien, St. Luke's Hospital	22
Hunan, Tsinglan Hospital	2
Kiangyin, Kiangyin Christian Hospital	5
Kityang, Kwangtung, Bixby Memorial Hospital	10
Kuiten, Fukien, Wiley General Hospital	6
Soochow, Soochow Hospital	6
Swatow, E.P. Mission Hospital	3
Swatow, Swatow Mission Hospital	5
Taichow, Kiangsu, Sarah Walkup Hospital	10
Tientsin, German-American Hospital	1
Tientsin, Dr. Irwin	1
Wuchang, Church General Hospital	1
Wusih, St. Andrew's Hospital	50
Yenping, Fukien, Alden Speare Hospital	10
Yunnanfu, Yunnan, Church Missionary Hospital	1
	283

Autopsies

Autopsies conducted by us were eighteen in number, of which fifteen were performed at St. Luke's Hospital and only two at the Lester Hospital. It is regrettable that the hospital to which this institute is most closely attached should not be able to secure more post-mortem material. Possibly the association of a School of Medicine with St. Luke's Hospital enables the latter to lay more stress on the importance of pathological findings in disease.

Research Work

The Histo-pathology of the spleen was made a special subject of investigation following up the interesting findings in the splenomegaly cases from Foochow. The suspicion that Schistosomiasis was the cause of the Fukien province cases of splenomegaly, was amply confirmed by Dr. Robertson on a field research visit to the endemic centres near the town of Futsing.

It is satisfactory to note that, in this particular investigation, the initial observations which were made in the Tissue Pathology Laboratory of this Institute by Dr. L. S. Kau gave a clue to the clearing up of the etiology of a disease process affecting many thousands of cases in a distant province. We record our indebtedness to Dr. Campbell of the Union Hospital, Foochow, for placing the problem before us and permitting us to collaborate with him in a study of his series of splenectomy cases. The results of this investigation were reported in the *Chinese Medical Journal*, November, 1936.

In collaboration with Dr. Kuang Wu, Research Fellow in Helminthology, Dr. L. S. Kau has continued a series of studies in the animal pathology of certain Trematode infections. This work has included the histopathology of Paragonimiasis and Fasciolopsiasis. This subject is recorded in more detail under Helminthology.

Much interesting information has been obtained with regard to the tissue pathology of Schistosomiasis from material obtained from the municipal abattoirs. On account of the difficulty of securing human post-mortem material in China for pathological investigation, we have been more and more dependent on the study of tissues from animals suffering from similar diseases. This has yielded most valuable information and we record our indebtedness to Dr. Jordan, Commissioner of Health of the International Settlement and to Dr. Rabaute, Directeur des Services de Hygiene and Assistance of the French Concession for giving us access to material from the abattoirs in their respective areas.

L. S. Kau:

" Histological Studies of Splenomegaly—with Special Reference to Material from the Foochow Area." *Chin. Med. J.*, 1936, **50**, pp. 1577-1584.

(4) PARASITOLOGY

(*a*) *Protozoology*.

The chief undertaking in the field of Protozoology has been the completion of a survey of Malaria in Kiaochiao. As commented upon in the Annual Report for 1935, we commenced a survey of Malarial cases by taking blood films from clinic patients and school children in the Kiaochiao area. Mr. Harry Ling commenced this work during his scholarship appointment and Dr. Mary Andrews took the investigation up on her return from long leave.

A collaboration has been established between our staff and Dr. George Chu, Parasitologist to the National Medical College, Shanghai. Over 10,000 examinations have been completed and the results of these have now been statistically analysed. The report on this investigation will be presented at the April, 1937, Conference of the Chinese Society of Pathology and Microbiology.

The chief points of interest are that all three species of Malarial parasite were found, but Plasmodium vivax was the dominant parasite.

The rate of infection for all species was 4.2 per cent., and the number of gametocyte carriers was found to be high.

MALARIA IN HOSPITAL PATIENTS

During the autumn, admissions for Malaria at the Lester Hospital became more numerous. A case of fatal subtertian malaria with cerebral symptoms was reported and investigated. The blood contained very numerous parasites.

During October, November and December we examined 55 specimens of blood and noted a very high rate for *Plasmodium falciparum*. The figures were:

P. falciparum	26
P. vivax	24
P. malariæ	4
Combined *P. vivax* and *P. malariæ*	1

The Melanin test

We have found this test highly unspecific. Sera from normal people, Relapsing fever, Kala azar, Schistosomiasis and Malarial patients all gave negative results.

Dr. Peter Mar, of the Division of Physiological Sciences, kindly prepared Melanin for this investigation from both Chinese and European human hair.

Coccidiosis

Three varieties of this parasite have been discovered in dogs, *Isospora bigemina*, *Isospora rivolta* and *Eimeria canis*. This latter species is comparatively rare.

The symptom produced in dogs is severe diarrhœa. At times the animals are not obviously affected although diseased.

We also found coccidia in six squirrels which we examined. This parasite has been described in squirrels before, but as far as we know has not been reported from China.

Relapsing Fever

Dr. Andrews undertook the hæmatological and clinical aspect of the team work on Relapsing Fever.

Contacts with the various hospitals in the city admitting Relapsing fever patients were made. This disease is difficult to follow up from the clinical aspect, as unless the patients are severely ill, hospitals are apt to administer N.A.B. as soon as the diagnosis is confirmed and send the patients home. If they relapse it is possible they may come to out-patient clinics, but the majority apparently are cured and are not traceable.

This makes information, as to what the exact situation is, very difficult to estimate.

The blood examinations revealed findings somewhat similar to those noticed in previous epidemics, namely an excess of polymorphonuclear leucocytes with some vacuolation in evidence.

Large lymphocytes and mononuclears were relatively common.

Demonstration

A demonstration on Malaria from the protozoological and entomological aspect was given to a group of Public Health workers from the Wei Sheng Shu, Nanking, by Dr. Andrews and Dr. Stephen Hu.

(*b*) *Helminthology*

During 1936, Dr. Kuang Wu has continued his research fellowship and was placed in charge of the Helminthology Laboratory as from June 1st. The general work under review includes the same problems outlined in last year's report. We have made research upon Trematoda infections one of the chief features of our interests in Helminthology, since these helminths are of such importance in human parasitology in China.

Schistosomiasis

The chief contribution to work in this disease was the confirmation of the endemicity of Schistosomiasis in Fukien province in areas around Foochow. Dr. Robertson and Mr. S. Y. Liu made an investigating visit to Futsing area and were able to demonstrate the ova of *Schistosoma japonicum* in the various splenomegaly cases, as well as cercariæ from infected *Katayama* snails. This concluded a series of investigations which cleared up a most important question in the etiology of splenomegaly cases in Fukien which, for long, were considered by various authorities to be Banti's disease.

A further contribution to the knowledge of the endemic regions of Schistosomiasis was made by Dr. Kuang Wu, following upon a number of field research trips to the Shanghai Hills region about 21 miles south-west of Shanghai. The event leading up to this finding was that during the summer months about 60 Russian Boy Scouts were camping in the Hills region. After they returned to the city in September many developed the disease. Investigating trips were immediately made to the locality where the scouts had been bathing in the creeks where infected *Oncomelania* snails were found. Young snails and snails in copula were seen in September and October, 1936. Many of the snails were found along the edge of the water in the canals where much boat traffic takes place. Subsequent trips were made there every month to study the bionomics of *Oncomelania*, a knowledge of which is much neglected, but is essential to the control of the disease in an endemic area.

Our general concepts as to the effect of tide and water currents on *Oncomelania* breeding will have to be revised. The ebb and flow in the Whangpu affects the waterways around Zose to a slight extent, but there is no adequate flushing effect. It is just possible that if a better flushing effect could be arranged the snail population would gradually diminish. This aspect of the question is well worth further study. It is a matter on which we cannot be dogmatic at the moment.

It is most disappointing that the public of Shanghai do not fully appreciate the repeated warnings of the City Health Authorities and continue to expose themselves to Schistosomiasis infection. From our personal knowledge and scientific investigations of the situation, we are able to state emphatically that bathing in creeks, and ponds of any description in areas a hundred miles around Shanghai is dangerous. It is not a matter of uncertainty. Too many human guinea pigs have proved the issue to their sorrow.

Another investigation of interest was the occurrence of Schistosomiasis japonica among the cattle slaughtered in the various Municipal Abattoirs. Small pieces of livers were examined for the eggs of *S. japonicum* from 156 oxen and 140 water buffaloes. The percentage of Schistosome infection in the livers of one batch of oxen examined was as high as 33 per cent, and one batch of water buffaloes as high as 23 per cent. Adult worms have been found in the mesenteric veins of oxen and the eggs found present in the excreta. The cattle examined came from the interior of Chekiang province, the centers being Chuhsien, Kinhwa, Kashing, etc. Some of the animals came from Kiangsu and Northern Anhwei. These regions are already known as endemic centers of human Schistosomiasis. This study indicates that cattle may serve as an important reservoir host of Schistosomiasis in China. It is important, however, to note in this connection that the disease cannot be transmitted direct from cattle to man, but only through the development of cercariæ in snails.

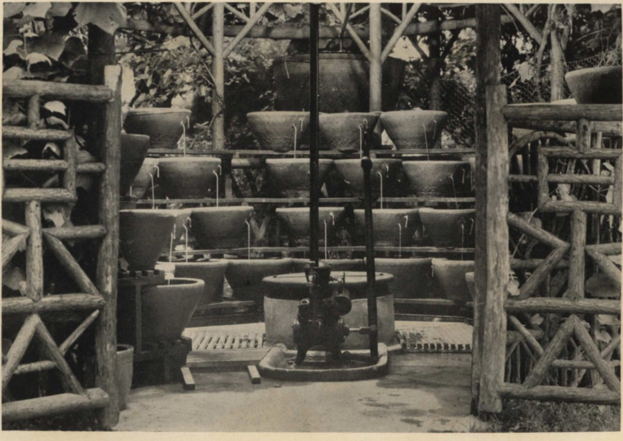
Paragonimiasis

A very unusual case of paragonimiasis was brought to our attention from the Clinical Division at the Lester Hospital. This patient exhibited symptoms of a transverse myelitis of the spinal cord. Suspicion of paragonimiasis being the cause of pressure on the spinal cord was first aroused due to finding the eggs of the parasite in the stools and sputum. At operation a large number of *Paragonimus* eggs were obtained from the site of the spinal lesion.

Animal experiment is bringing out the findings of immature *Paragonimus* worms in various organs of the body. We now find immature worms in the liver, omentum, mesentery, fascia, diaphragm as well as in the chest and abdominal cavity when animals are heavily infected. The migratory course of *Paragonimus* in the body of the definitive host is still under investigation in co-operation with the Tissue Pathology Laboratory. Other studies concerning the structure of the miracidium and its behaviour, the resistance of the metacercariæ under various conditions, the susceptibilities of various mammals to the infection have also been carried out. The results are still being analysed prior to publication.

In order to reproduce the life cycle of the lung fluke in the laboratory, an aquarium has been set up to imitate the natural habitat of the *Melania* snails which prefer to stay in clear, running water. Although improvements still need to be made, definite progress has been shown that the molluscs can be kept alive much longer in the laboratory, than heretofore. This study is essential to the elucidation of the etiology of the disease.

Investigation upon the distribution of the disease in China has been kept up since last year. Efforts have been made to collect crabs from the provinces of Kiangsi, Shantung and Fukien. In a small batch of fresh water crabs, collected during our visit to Futsing, Fukien, out of thirty-nine crabs, two were found to have *Paragonimus* metacercariæ or cysts in their muscles and one in the gills. The crabs are identified as *Parathelphusa sinensis*, another intermediate host of *Paragonimus* in this country.



Artificial River Bed for Study of Parasites in Molluses

Fasciolopsiasis

Twelve kinds of mammals were experimentally infected with the metacercariæ of *Fasciolopsis buski* removed from the skin of the red water caltrops collected in Shiaoshan, Chekiang. Their comparative susceptibilities to the infection have been so far noted as follows : seven pigs were examined, all took the infection as shown by the finding of mature worms ; three dogs were examined, only one was infected with immature worms ; three rabbits were examined, two were infected with immature worms ; one monkey was examined, only immature worms were found. In the buffalo, immature *Fasciolopsis* was found, but since the host was kept less than a month, additional experiment had to be made. The following animals, three cats, one sheep, one goat, one ox, five guinea pigs, five rats and 10 mice were found to resist the infection. This experiment tends to indicate that control and prevention of Fasciolopsiasis is not complicated by many reservoir hosts with the exception of pigs. Therefore human infection plays an important rôle in disseminating the eggs of *F. buski* in an endemic region.

In the course of the study two additional aquatic plants, tentatively determined as *Salvinia natans* and *Lemna polyrhiza* were found as carriers of *Fasciolopsis buski* in Chekiang. These plants commonly occur in the fields of the red water caltrops or water bamboo. The finding indicates that metacercariæ of this trematode are not highly specific to certain plants and there is a possiblity of many other types of aquatic vegetation being involved.

Co-operative work has been maintained with the Division of Physiological Sciences mainly along three lines : (1) to find a drug, cheap in price, efficacious in cure and safe in the hands of the layman for treatment of the disease (2) to find out the vitamin contents of the various organs of the infested pig, especially the duodenum of the animal where the worms cause lesions (3) to find out the constituents of the dry powdered *Fasciolopsis*. Work is still in progress.

Immunological studies are commented upon under Immunology and Serology.

Entozoa of Shrimps

Three species of digenetic trematodes were found as encysted metacercariæ in the fresh water shrimps, *Palæmon asperulus* von Marten and *P. nipponensis* de Haan collected from Huchow and Soochow. One species described as new, *Phyllodistomum lesteri*, sp.

nov. exhibits its precocious genital activity as a metacercaria in the liver and genital glands of the shrimps. Feeding experiments indicate so far that the metacercariæ fail to develop in these two species of fish, *Odontobutis obscura* and *Pelteobagrus fulvidraco* and a species of toad, *Bufo b. asiaticus*. It will be interesting to find out the final host of this new trematode or to throw light upon the vexed question, " Is there an abridged life cycle or omission of a final host in the life history of a digenetic trematode ? "

The other two trematodes mainly encysted in the muscles of shrimps were, *Coitocæcum* sp., which so far matures in three species of fresh water fishes, *Odontobutis obscura*, *Pelteobagrus fulvidraco* and *Macropodus chinensis* and *Microphallus* sp., adults of which have not yet been determined.

The above communications were presented in the Zoological Section of the Science Societies of China, held in Peiping, August, 1936.

Helminthic fauna in Animals around Shanghai

Information upon the helminths infesting animals other than man is still scanty in this country, yet there are undoubtedly very many species. Arrangements have been made with the authorities in the Zoological Garden of Greater Shanghai, the Zoological Garden of Jessfield Park, Messrs. Keylock and Pratt, Veterinary Surgeons as well as the various laboratories of the Institute for permission to examine carcasses of animals. By this means a fair number of helminths have been collected, some of which are classified and others are preserved for future study. This year the following animals have been examined : 80 fishes, 50 toads, 45 frogs, eight turtles, one parrot, two leopards, one elephant, two squirrels, 24 hedgehogs, 30 cats, three dogs and a number of laboratory-bred animals.

Some helminths of common interests are worthy to be recorded here ; *Paragonimus* are found in leopards ; *Murshidia* in the elephant ; *Harmostomum* in hedgehogs ; *Pneumonœces* in frogs ; *Telorchis* in turtles ; *Phyllodistomum* in toads and *Isoparorchis* in fishes. The size and shape of the last trematode resemble greatly *Fasciolopsis buski* and it has been taken for the latter by the local people in the endemic region of Fasciolopsiasis. *Isoparorchis* has also been reported from human sources in other countries.

In fishes, another new species of *Phyllodistomum P. sinense* sp. nov. has been found in the urinary bladder of *Odontobutis obscura* (Tem and Schl.)

Examination of Dogs for Parasites

Dr. M. N. Andrews has completed a series of examinations of dogs' fæces. Out of 83 dogs examined, 43 contained parasites as follows:

	Dogs
Giardia cysts	1
Coccidia	6
Ascaris ova	4
Hookworm ova	17
Trichuris ova	4
Strongyloides larvæ	2
Tænia ova	1
Dibothriocephalus ova	1
Schistosoma japonicum ova	17
Clonorchis sinensis ova	1

Clinical Parasitology

A report on the various routine examinations made for protozoa and helminths appears in the Appendix.

R. C. Robertson:

"Schistosomiasis in the Foochow Area." *Chin. Med. J.*, 1936, **50,** pp. 1555-1560.

K. Wu:

"Preliminary Note on the *Paragonimus* metacercariæ among the Crabs at Futsing, Fukien." *Proc. Sci. Societies of China (Zoology Section) Peiping,* 1936, pp. 44-45.

"Two Encysted Trematodes of Fresh water Shrimps around Shanghai Region." *Peking Nat. Hist. Bull.*, 1936-37, **11,** pp. 199-204.

"Progenetic Development of *Phyllodistomum lesteri* sp. Nov." (*Trematoda: Gorgoderidæ*) *Proc. Sci. Societies of China (Zoology Section) Peiping,* 1936, pp. 40-42.

"On the Occurrence of *Isoparorchis* in China." (*Trematoda: Isoparorchidæ*) *By Demonstration. Proc. Sci. Societies of China (Zoology Section) Peiping,* 1936, p. 45.

"A Pictorial Presentation on the Human Helminths common in Central China." *By Demonstration. Proc. Sci. Societies of China (Zoology Section) Peiping,* 1936, p. 45.

(5) MEDICAL ENTOMOLOGY

Filarial Transmission

Studies on various phases of host-parasite relationship between *Wuchereria bancrofti* and their mosquito intermediate hosts were continued. The problem of whether susceptibility to infection with filarial larvæ was an inherent characteristic in the individuals of *Culex pipiens* var. *pallens*, was studied through repeated infections of the mosquitoes with the microfilariæ. Some mosquitoes which resisted the infection at the first feed were found infected at the second feed and vice versa. The effect on the longevity of mosquito hosts which were heavily infected with filarial larvæ was investigated. Similar mosquitoes, fed at the same time on uninfected blood, were used as control for the experiments.

A brief survey of filariasis and mosquitoes in Foochow and Futsing regions was undertaken during the summer by Dr. Stephen Hu. Data on the incidence of filariasis in these regions were collected by taking blood smears of people in hospitals, schools and a prison. *Microfilaria malayi* infections were found to be endemic in the province, along with *Microfilaria bancrofti*. Eighteen species of mosquitoes were collected, eight of which were new to the province and two of which have not been reported for China.

Zoophilism of Anopheles

Observations on the maxillary index of *A. hyrcanus* var. *sinensis* were continued. It was found not to correlate sufficiently with the blood meals of the anophelines, as determined by precipitin tests by Dr. H. Yu, to furnish a reliable guide concerning the nature of the host preferences of this species.

A. hyrcanus var. *sinensis* obtained from bedrooms were starved and later enclosed overnight in a room with different types of domestic animals, along with man, so as to test their blood preferences. The large proportion found to have fed on the blood of the domestic animals, rather than that of man, was very similar to that shown previously by batches of this mosquito originally obtained from a cow stable and submitted to a similar test.

Rice Cultivation and Anopheles

Observations were carried out by Mr. Chang Teh-ling at our Entomological Field Station at Kaochiao, concerning the relation of the local methods of rice cultivation and the production of anophelines in the paddy fields. The influences of flooding and "fertilization," as well as the various processes used locally in rice culture, were investigated.

Mosquito Taxonomy

Comparative studies were made on the larval characters of *Culex pipiens* var. *pallens* and *Culex fatigans*. The pupal and adult characters of these two species, which resemble each other very closely, are also being studied, with a view to finding more distinguishing marks of differences between the species.

Taxonomy of Flies

A collection of household flies was made, with the aid of public health inspectors of the city. Taxonomic studies are being made of these specimens.

Lice and Relapsing Fever

Data on the incidence of lice infestation among cases selected at random in the Out-patient Department of the Lester Chinese Hospital were obtained. With the co-operation of officials of the Public Health Department of the Shanghai Municipal Council, examinations were made of the living quarters of relapsing fever cases.

Dissection of lice obtained from relapsing fever cases were made to ascertain their natural infection rate with the spirochætes. Studies on problems connected with the experimental infection of lice with the spirochætes were started, in conjunction with Dr. H. Wei. These observations will be continued during 1937.

Bedbugs and Relapsing Fever

A stock of *Cimex hemipterus* was obtained from southern China. Specimens of this species and *Cimex lectularis*, obtained in Shanghai, were reared for experimental studies of their abilities in transmitting the relapsing fever spirochætes.

Projected Research for 1937

We have made preparations to study the various factors connected with anopheline breeding in the Hungjao Road district in the coming season. We hope to correlate these facts with the incidence of malaria amongst Chinese and Foreign residents in that area. For the purpose of this investigation we contemplate making Millington Camp site a centre for observations in approximately a half mile radius. We are assured of co-operation from the Health Authorities of the International Settlement and the Municipality of Greater Shanghai.

S. M. K. Hu and H. Yu:

"Preliminary studies on the blood preferences of *Anopheles hyrcanus* var. *sinensis* Wiedemann in Shanghai region." *Chin. Med., J.*, 1936, Suppl. 1, pp. 379-386.

F. E. Baisas and S. M. K. Hu :

"*Anopheles hyrcanus* var. *sinensis* of the Philippines and certain parts of China, with some comments on *Anopheles hyrcanus* var. *nigerrimus* of the Philippines." *Monthly Bull. Bureau of Health, Manila*, 1936, **16**, pp. 205-242.

T. L. Chang and S. P. Cheu :

"Comparative notes on the larval characters on *Culex pipiens* var. *pallens* Coquillet and *Culex fatigans* Wiedemann." *Lingnan Sci. J.*, 1936, **15**, pp. 613-626.

T. L. Chang :

"Further notes on the maxillary teeth of *Anopheles hyrcanus* var. *sinensis* Wiedemann in Shanghai region." *Lingnan Sci. J.* 1937, **16**, pp. 5-8.

SCIENTIFIC PHOTOGRAPHY

A review of the activities of the Photographic Laboratories under the control of Mr. R. V. Dent, F.R.P.S., Associate in Scientific Photography, shows that a great diversity of subjects have been photographed during 1936.

The work of this department has become of ever increasing value to the Institute, both for record purposes and in connection with various types of research work where details of microscopic or general structure cannot be readily seen visually.

The appearance of various preparations can be studied photographically by illumination with different wave lengths of light. The application of this principle has been of great service in many different fields of work.

Greater stress has been made recently on the photography of living specimens, so that changes due to fixation or death of the organism or tissue can be avoided.

Photographs of this nature can be compared with those of stained preparations and various morphological characteristics studied accurately.

Many new technical devices have been elaborated to deal with the photographic side of this work, so that specimens of a transient nature can be adequately recorded.

It has been found necessary, when dealing with the photography of lesions on living animals, or on other moving surfaces which cannot be immobilized to improve the technique of synchronization of flash bulbs with camera shutters.

All our cameras are now fitted with this device and a special electric circuit, including transformer and condenser with multiple connections, has been elaborated so that the firing of the flash is a certainty.

A special camera for use in the photography of the nasopharynx of patients has been constructed.

Among some of the interesting subjects for high power photo micrography have been new morphological features of the spirochætes of relapsing fever studied in the living condition whilst the organisms reproduce. The various stages of the life cycle of important Helminths have been recorded and a remarkably fine series of studies of the miracidia of Fasciolopsis buski hatching out from the egg, has been made.

Among interesting low magnification subjects, the expansion and contraction of blood vessels in the ears of animals has been recorded for the workers in Pharmacology.

A number of skin abnormalities in patients suffering from varying degrees of hypovitaminosis have been photographed.

The services of the photographic laboratory have been in much request for the illustration of scientific papers for publication and for lantern slides in connection with Institute lectures.

Photographic records have been made in connection with Institute field investigations and frequently the subjects had to be recorded under very difficult conditions of lighting and in cramped spaces.

The research side of scientific photography has received as much attention as could be devoted to it without hindering the increased output of the department in supplying an indispensable Institute service.

Frequently a special subject offers particular difficulty from the photographic angle and special apparatus has to be assembled to deal with the problem. It is only by close co-operation between the scientific worker concerned and the Associate in Photography that success is assured. This system of co-operation has been much advanced during the year under review, but still offers possibilities for improvement.

We have extended our facilities for scientific photography by special arrangement on several occasions to outside Institutions such as the National Medical College, Shanghai; Central field Health Station, Nanking; National Quarantine Service and Chiao Tung University.

The Lester Technical Institute have availed themselves of a complete photographic recording of their equipment and plant.

Copying by photostatic processes is performed for various workers and in connection with the Institute library.

A complete slide library is maintained for this department of the Institute.

Among some of the additional equipment secured during 1936, may be mentioned the Davidson Supermicroscope and attachment and the microtelescope. A new vertical camera with optical bench for vertical work in photo-micrography has been constructed locally. The Eastman Pola screen for working in polarized light has been obtained, also certain further illuminating devices for low power microscopy.

It is very gratifying that during 1936, Mr. R. V. Dent was awarded the honour of Fellowship of the Royal Photographic Society for work in Scientific Photography done in this Institute.

R. V. Dent:

"Critical Slide-making." *Brit. J. Photography*, July 17, 1936.

Journal Club

During 1936, the scientific staff met weekly in conference on a selected subject connected with some feature of the research work in hand. We found it added greatly to the interest of the proceedings for each worker to review a topic which had fairly broad aspects, so that workers in divergent lines or fields of study could contribute something in discussions.

The chief topics for symposia were as follows:

"Review on Roubaud's Theories on the Food Preference of Anopheles."
"Discussion on Problems of Kala Azar, Malaria and Schistosomiasis."
"Immunity in Filtrable Virus Diseases."
"The 'Vi' Antigen of B. typhosus."
"Amino Acids in Bacteriology."
"A Review of Literature on Bronchiectasis and Ascariasis of the Lung."
"Life History of Some Helminths with Special Reference to the Routes of Migration in the Definitive Hosts."
"Review on the General Physiology of Some Helminths."
"Local Anopheles under Winter Conditions with Notes on Malarial Parasites during Hibernation."
"A Review of the Problem of Hibernation."
"Anæmia in Hookworm Disease."
"Nature and Mechanism of the Complement Fixation Test."
"A Review on Relapsing Fever."
"Some Recent Papers on Relapsing Fever."
"Review of Literature on Development of Relapsing Fever Spirochætes in Insect Host."
"Report on the Morbid Anatomy of Relapsing Fever Cases autopsied at St. Luke's Hospital."

"Recent Advances in the Classification of Digenetic Trematodes."
"Report on the Expedition to Futsing, Fukien."
"Rice Cultivation and Anopheline Breeding."
"Studies on Toxic Substances of the Typhoid Bacillus."
"Developmental Forms of Spirochætes with Special Reference to the Relapsing Fever Spirochætes."
"Schistosomiasis in Experimentally Infected Laboratory Animals."
"A Review on Some of the Enlarged Spleens from Foochow."
"Recent Advances in the Study of Anopheles in Relation to Malaria Transmission."
"Review of Recent Literature on the Virus Diseases of the Nervous System."
"Cardiac Failure due to Heterophyidiasis."

Lectures

Lectures given by members of the staff to outside institutions and medical societies were as follows :

Lecturer	*Subject*	*Given to*
Dr. R. C. Robertson	Schistosomiasis with Reference to New Endemic Centres.	C.M.A., Shanghai Branch.
Dr. R. C. Robertson	Schistosomiasis Field Work.	Rotary Club, Shanghai.
Dr. S. M. K. Hu	Transmission of Filariasis by Shanghai mosquitoes	Rotary Club, Shanghai.
Dr. H. Wei	Filtrable Viruses	National Medical College, Shanghai.
Mr. R. V. Dent	Photography	Univ. of Shanghai.
Dr. K. Wu	Some Common Human Helminths of the Yangtze Valley	Public Health Club, Shanghai.
Dr. K. Wu	Some Common Human Helminths in China.	National Medical College of Shanghai.
Dr. F. F. Tang	Bacteriology of Tuberculosis	C.M.A., Shanghai Branch.
Dr. F. F. Tang	Visit to Various Countries from Medical and Public Health Standpoints.	Shanghai Public Health Club.
Dr. H. Yu	Bacteriology of Typhoid Fever	National Medical College of Shanghai.

Visiting Technicians in Training

During 1936, five technicians from other institutions and hospitals, including the C.M.S. Hospital, Hangchow ; General Base Hospital, K.M.A., Tongshan; Institute of Hospital Technology, Hankow; Changchow General Hospital, Changchow; Lucie F. Harrison Hospital, Futsing, Fukien, received short courses of training in advanced laboratory methods. In rotation, they were placed in each section, spending the longer time in the section dealing with the subject in which greater proficiency was desired.

An examination was instituted and the results showed that the average of attainment was high.

Short instructional courses were held for our own junior technicians.

Lectures to Nurses

Two courses of lectures on Bacteriology were given during 1936, to the nurses undergoing training at the Lester Chinese Hospital; one course during the spring and one during the autumn. Each course included the following subjects:

The Rôle of Bacteriology in Nature and Disease	Dr. Robertson
Morphological and Biological Properties of Bacteria	Dr. Wei
Methods of Studying Bacteria	Mr. Shang
Destruction of Bacteria	Mr. Chang
Common Disease Producing Organisms...	Dr. Wei
Bacteria and Disease: Mode of Transmission and General Methods of Prevention	Dr. Yu
Active and Passive Immunity	Dr. Yu
General Resumé	Dr. Wei and Dr. Tang.

The Supply of Material for Teaching and Research to Universities and Other Institutions

The collecting system, which was commented upon in last year's report, has been found to be valuable in practice. A list of the contributions made appears in the Appendix.

We are unable to make this work, which involves much time and labour, a definite feature of our organization, though we feel that by interchanges of teaching and research material, relationships with other institutions abroad can be fostered and maintained.

On this account we have attempted to meet most of the requests whenever possible, and only stipulate that the receipt of such donations of specimens or illustrations be duly acknowledged as betwixt institutions. Further, that when specimens or photographs are placed in a museum elsewhere that due acknowledgment of their origin should be indicated on the label.

Technical Services

A detailed list of all services appears in the Appendix.

APPENDIX I

LIST OF PUBLICATIONS BY THE STAFF OF THE INSTITUTE *

F. E. Baisas and S. M. K. Hu :

"*Anopheles hyrcanus* var. *sinensis* of the Philippines and Certain parts of China, with some comments on *Anopheles hyrcanus* var. nigerrimus of the Philippines." *Monthly Bull. Bureau of Health*, Manila, 1936, **16,** pp. 205-242.

T. L. Chang :

"Further Notes on the Maxillary Teeth of *Anopheles hyrcanus* var. sinensis Wiedemann in Shanghai region." *Lingnan Sci. J.*, 1937, **16,** pp. 5-8.

T. L. Chang and S. P. Cheu :

"Comparative notes on the Larval Characters on *Culex Pipiens* var. *pallens* Coquillet and Culex fatigans Wiedemann." *Lingnan Sci. J.*, 1936, **15,** pp. 613-626.

R. V. Dent :

"Critical Slide-making." *Brit. J. Photography*, July 17, 1936.

S. D. Du :

"Simple and Rapid Methods of Staining Treponema Pallidum." *Chin. Med. J.*, 1936, **50,** pp. 1283-1285.

M. Y. Dzen and H. Yu :

"The Optimum Dosage of Prophylactic Cholera Vaccine." *Chin. Med. J.*, 1936, Suppl. I, pp. 198-201.

H. S. Gear :

"Disease Incidence in China." *Chin. Med. J.*, 1936, **50,** pp. 949-972.

H. S. Gear :

"Epidemiological Notes on Scarlet Fever in China." *Chin. Med. J.*, 1937, **51,** pp. 203-210.

H. S. Gear :

"The Study of Disease Prevalence in China." *Trans. R. Soc. Trop. Med. Hyg.*, 1936, **29,** pp. 679-689.

J. Gray :

"Some Observations on Experimental Renal Section." *Lancet*, **1,** 1936, pp. 359-362.

J. Gray :

"Stricture of the Urethra." *J. Clin. Med.*, 1936, **1,** pp. 114-123.

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* Papers appearing in *Chin. M. J.* Supp. 1, 1936, were reported in 1935.

J. Gray:

"Urinary Stone Formation, Clinical and Experimental." *Chin. Med. J.*, 1936, **50**, pp. 761-786.

H. C. Hou:

"The Destruction of Ascorbic Acid in Water." *J. Chin. Chem. Soc.*, 1936, **4**, pp. 224-234.

H. C. Hou:

"Fixation of Ascorbic Acid by Tissues." *Proc. Soc. Exp. Biol.* N.Y., 1936, **34**, pp. 833-835.

H. C. Hou:

"Further Studies on the Chemical and Biological Assay of Vitamin C." *Chin. J. Physiol.*, 1936, **10**, pp. 191-198.

H. C. Hou:

"The Influence of Diet on the Formation of Urinary Calculi." *Chin. Med. J.*, 1936, **50**, pp. 787-796.

H. C. Hou:

"The Relation Between the Antiscorbutic Activity and the Mode of Administration of Ascorbic Acid." *Chin. J. Physiol.*, 1936, **10**, pp. 213-220.

H. C. Hou:

"The Relation of Vitamin A to Health and Disease." *Chin. Med. J.*, 1936, **50**, pp. 1481-1492.

H. C. Hou:

"Studies on the Biological and Chemical Assays of Vitamin C in Foods. III. Assay of Cooked Vegetable and Its Soup." *Chin. J Physiol.*, 1936, **10**, p. 659, and Proceedings, p. 16.

H. C. Hou:

"Studies on the Interrelationship of Vitamins and Other Dietary Constituents. II. Change of Dietary Constituents on the Pathological Effect of Avitaminosis A." *Chin. J. Physiol.*, 1936, **10**, p. 659, and Proceedings, pp. 15-16.

H. C. Hou:

"Studies on the Vitamin C content of Orange Peel and Its Pharmaceutical Preparations." *Chin. Med J.*, 1936, **50**, pp. 1227-1234.

H. C. Hou:

"The Variation of Vitamin C Content in Certain Fruits and Vegetables." *Chin. J. Physiol.*, 1936, **10**, pp. 221-236.

H. C. Hou:

"The Vitamin A content of Hunan La-chiao, *Capsicum annum* L. var. Longum." *Chin. J. Physiol.*, 1936, **10**, pp. 171-178.

H. C. Hou:

"Vitamin C and its Relation to Disease." *Chin. Med. J.*, 1936, **50**, pp. 536-553.

H. C. Hou:

"The Vitamin C content of Hunan La-chiao, *Capsicum annum* L. var. Longum." *Chin. J. Physiol.*, 1936, **10**, pp. 179-186.

H. C. Hou:

"Vitamin C in Nutrition in China." *Nutrition Notes*, 1936, No. 6.

H. C. Hou:

"Vitamin Studies of Chinese Citrus Fruits and Their Commercial Products." *Chin. J. Physiol.*, 1936, **10**, p. 660, and Proceedings, pp. 16-17.

S. M. K. Hu and H. Yu:

"Preliminary Studies on the Blood Preferences of *Anopheles hyrcanus* var. *sinensis* Wiedemann in Shanghai Region." *Chin. Med. J.*, 1936, Suppl. I, pp. 379-386.

L. S. Kau:

"Histological Studies of Splenomegaly—with Special Reference to Material from the Foochow Area." *Chin. Med. J.*, 1936, **50**, pp. 1577-1584.

W. Y. Lee:

"The Formation and Distribution of Vitamin C in the Germinating Pea, *Pisum sativum* L. (Blue Bantam Variety)." *J. Chin. Chem. Soc.*, 1936, **4**, pp. 219-223.

W. Y. Lee and H. L. Li:

"Distribution of Phosphorus in Germinating Soybeans." *Chin. J. Physiol.*, 1936, **10**, pp. 661-662, and Proceedings, pp. 19-21.

W. Y. Lee and B. E. Read:

"The Effect of Light on the Production and Distribution of Ascorbic Acid in Germinated Soybeans." *J. Chin. Chem. Soc.*, 1936, **4**, pp. 208-218.

W. Y. Lee; E. Reid and B. E. Read:

"Industrial Health in Shanghai, China. III. Shanghai Factory Diets Compared with those of Institutional Workers." *Chin. Med Ass.*, Special Report Series No. 7, 1936.

G. D. Lu and B. S. Platt:

"The identification, estimation and excretion of pyruvic acid in the urine of apparently healthy individuals." *Chin .J. Physiol.*, 1936, **10**, p. 663.

P. G. Mar:

"New Sources of Vitamin A." *Chin. Med. J.*, 1936, **50**, pp. 1086-1097.

P. G. Mar:

"Vitamin and Pro-vitamin A contents of Chinese foods (A Preliminary Report)." *Chin. J. Physiol.*, 1936, **10**, p. 663, and Proceedings, p. 25.

P. G. Mar and B. E. Read:

"Chemical Examination of Chinese remedies for nightblindness." *Chin. J. Physiol.*, 1936, **10**, pp. 273-284.

H. P. Marks and C. Pak :

" Evaluation of the New International Standard Insulin by the Rabbit and Mouse Methods of Assay." *Quart. Bull. Hlth. Org.*, L. o. N., 1936, **5**, pp. 631-651.

J. L. Maxwell :

" The Fight Against Leprosy." *Chin. Med. J.*, 1936, **50**, pp. 742-743.

J. L. Maxwell :

" Geographical Distribution of Vesical Calculus in China." *Chin. Med. J.*, 1936, **50**, pp. 827-828.

J. L. Maxwell :

" Leprosy : A Practical Text-book for use in China." Shanghai, 1937, p. 109.

J. L. Maxwell :

" The Need for a Clinical Journal." *J. Clin. Med.*, 1936, **1**, pp. 5-6.

J. L. Maxwell :

" The Task Before us." *Chin. Med. J.*, 1936, **50**, pp. 716-720, and Leper Quart., 1936, **10**, pp. 41-47.

T. G. Ni :

" The Creatine-creatinine Excretion and the Creatine Content of the Muscle in Nutritional Muscular Dystrophy." *Chin. J. Physiol.*, 1936, **10**, pp. 199-206.

T. G. Ni :

" The Effect of Donkey Skin Gelatin (Ah-chiao) upon Nutritional Progressive Muscular Dystrophy." *Chin. J. Physiol.*, 1936, **10**, pp. 237-248.

T. G. Ni :

" Effect of Glycine on the Neuro-muscular system." *Chin. J. Physiol.*, 1936, **10**, p. 664, and Proceedings, p. 26.

T. G. Ni :

" The Use of Ah-chiao (donkey skin glue) for Circulatory Failure Encountered in Severe Hæmorrhage and Shock." *Chin. J. Physiol.*, 1936, **10**, pp. 125-134.

C. Pak and B. E. Read :

" The Anthelmintic Action of Propyl Guaiacol." *Chin. J. Physiol.*, 1936, **10**, pp. 249-258.

C. Pak and B. E. Read :

" The Comparative Action of Methylephedrine and Ephedrine. Part I. Systemic Effects." *Quart. J. Pharm.*, 1936, **9**, pp. 235-255.

C. Pak and B. E. Read :

" The Comparative Action of Methylephedrine and Ephedrine. Part II. The Bronchial Effects." *Quart. J. Pharm.*, 1936, **9**, pp. 256-267.

B. S. Platt:

"An Approach to the Problems of Infant Nutrition in China." *Chin. Med. J.*, 1936, **50**, pp. 410-424.

B. S. Platt:

"The Elucidation of some Features of Non-tuberculous Bronchiectasis." *J. Clin. Med.*, 1936, **1**, pp. 164-172.

B. S. Platt and G. D. Lu:

"Chemical and Clinical Findings in Beri-beri with special reference to Vitamin B_1 deficiency." *Quart. J. Med.*, N.S. 1936, **5**, pp. 355-370.

B. E. Read:

"Chinese Medicinal Plants." 3ed. p. 389, *Peking Nat. Hist. Bull.*, Peiping, 1936.

B. E. Read:

"Man's Protein Requirement." *J. Clin. Med.*, 1936, **1**, pp. 39-53.

B. E. Read:

"The Newer Pharmacology and its Relationship to Ancient Medicine II." *Peking Nat. Hist. Bull.*, 1936, **10**, pp. 309-318.

B. E. Read:

"Notes on the History and Treatment of Urinary Calculi in China." *Chin. Med. J.*, 1936, **50**, pp. 847-848.

B. E. Read; S. G. Hatem; Y. B. Dju and W. Y. Lee:

"Industrial Health in Shanghai, China, II. A Study of the Chromium Plating and Polishing Trade." *Chin. Med. Ass.*, Special Report Series No. 6, 1936.

B. E. Read and C. Pak:

"Minerals and Stones." 2ed. p. 98, *Peking Nat. Hist. Bull.*, 1936.

E. Reid:

"The Flourine Content of Some Chinese Food Materials." *Chin. J. Physiol.*, 1936, **10**, pp. 249-258.

R. C. Robertson:

"Schistosomiasis in the Foochow Area." *Chin. Med. J.*, 1936, **50**, pp. 1555-1560.

R. C. Robertson:

"Typhus Fever." *J. Clin. Med.*, 1936, **1**, pp. 96-113.

R. C. Roberston and H. Yu:

"The Serum Treatment of Typhoid Fever." *Brit. Med. J.*, II, 1936, pp. 1138-1140.

R. C. Robertson and H. Yu:

"The "Vi" Antigen of B. typhosus." *J. Path. Bact.*, 1936, **43**, pp. 191-196.

E. A. G. Shrimpton :

"Statistical Note—Relation between degrees of Vitamin B_1 deficiency and the amounts of bisulphite binding substances in the blood" *Quart. J. Med., N.S.* 1936, **5**, pp. 371-3.

H. G. Thompson :

"The Formation of Calculi in Human Body." *Chin. Med. J.*, 1936, **50,** pp. 849-851.

H. G. Thompson :

"The Spleen from the Clinical Point of View." *J. Clin. Med.*, 1936, **1,** pp. 207-215.

C. Tsai :

"The Nature of Combined Glycogen in the Liver and Muscle." *Chin. J. Physiol.*, 1936, Proceedings, p. 29.

C. Tsai and C. L. Yi :

"Carbohydrate Metabolism of the Liver. V. Sugar Intake in the Normal Intact Cat during Glucose Absorption." *Chin. J. Physiol.*, 1936, **10,** pp. 87-104.

C. Tsai and C. L. Yi :

"Carbohydrate Metabolism of the Liver. VI. Sugar Output and Intake in the Daily Digestive Cycle." *Chin. J. Physiol.*, 1936, **10,** pp. 105-118.

K. Wu :

"Entozoa of Fresh Water Shrimps around Shanghai Region." *Proc. Sci. Societies China* (*Zoology Section*), *Peiping*, 1936, pp. 42-44.

K. Wu :

"On the Occurrence of Isoparorchis in China." (*Trematoda*: *Isoparorchidæ*) *By Demonstration. Proc. Sci. Societies China* (*Zoology Section*), Peiping, 1936, p. 45.

K. Wu :

"A Pictorial Presentation on the Human Helminths common in Central China." *By Demonstration. Proc. Sci. Societies China* (*Zoology Section*), Peiping, 1936, p. 45.

K. Wu :

"Preliminary Note on the Paragonimus Metacercariæ among the Crabs at Futsing, Fukien." *Proc. Sci. Societies China* (*Zoology Section*), Peiping, 1936, pp. 44-45.

K. Wu :

"Progenetic Development of Phyllodistomum Lesteri Sp. Nov." (*Trematoda*: *Gorgoderidæ*) *Proc. Sci. Societies China* (*Zoology Section*), Peiping, 1936, pp. 40-42.

K. Wu :

"Two Encysted Trematodes of Fresh Water Shrimps around Shanghai Region." *Peking Nat. Hist. Bull.*, 1936-37, **11,** pp. 199-204.

P. T. Wu and H. G. Thompson:

"Observations on the Experimental Production of Peptic Ulcer in the Ileum." *Brit. J. Surg.*, 1936, **24,** pp. 183-187.

E. F. Yang and B. S. Platt:

"Further observations on the Supply and Excretion of Vitamin C in Man." *Chin. J. Physiol.*, 1936, **10,** p. 665.

H. Yu:

"Serum Therapy of Infectious Diseases." *J. Clin. Med.*, 1936, **1,** pp. 221-240.

H. Yu:

"The Serum Treatment of Typhoid Fever." *Chin. Med. J.*, 1936, **50,** pp. 159-164.

APPENDIX II

LECTURE PROGRAMME 1936-37.

Symposium:
  " The Functions of the Spleen."
Dr. O. R. McCoy:
  " Immunity against Helminth Parasites."
Dr. H. G. Thompson:
  " The Lymphoid Tissue of the Alimentary Tract."
Dr. C. Tsai:
  " The Nature and Function of the Combined Glycogen of the Body."
Dr. S. M. K. Hu:
  " Food Preferences of Anopheles in Relation to Malaria Transmission."
Dr. B. S. Platt:
  " Dietetic Deficiency Diseases in Shanghai. Part I. Clinical Manifestations."
Dr. H. Yu:
  " Serum Therapy of Infectious Diseases."
Dr. H. C. Hou:
  " Vitamin D."
Dr. Mary N. Andrews:
  " Host Parasite Relationships."
Dr. C. Pak:
  " The Physiological Standardization of Drugs."
Dr. J. L. Maxwell:
  " Retrospect and Prospect."
Dr. C. Y. Wu:
  " Some Modern Trends in Plague Work."
Dr. F. F. Tang:
  " Recent Advances in the Study of Filtrable Viruses."
Dr. P. G. Mar:
  " Natural Pigments Related to Vitamin A."
Dr. R. C. Robertson:
  " The Pathological Aspects of Chemical Warfare."
Dr. B. S. Platt:
  " Dietetic Deficiency Diseases in Shanghai. Part II—Treatment—Curative and Preventive."

Dr. K. Wu :
    " Fasciolopsiasis in China."
Dr. W. G. E. Eggleton :
    " Chemical and Bacterial Nitrification in Soil."
Dr. J. Gray :
    " The Accessory Sex Glands in the Male."
Dr. H. Wei :
    " Studies on the Spirochætes of Relapsing Fever."
Dr. T. G. Ni :
    " Experimental Fluorosis."
Mr. T. L. Chang :
    " Rice Cultivation in Relation to Malaria."
Professor L. T. Ride :
    " Fifty Years of Medical Education in Hongkong."
Dr. B. E. Read :
    " Dangerous Drugs."
Mr. E. A. G. Shrimpton :
    " The Use of Statistical Method in Medical Research."
Mr. R. V. Dent :
    " The Photographic Illustration of Medical Subjects."
Dr. H. G. Earle :
    " The Physiological Value of Rest and Sleep."

Appendix III

LIBRARY

Additions to the Library 1936

Books, Including Year Books

By purchase	172 Vols.
By exchange or donation from the publishing institutions ...	4 „
By private donation	12 „

Reports, Monographs, Collected Papers, etc.

By purchase	85 Items
By exchange or donation from the publishing institutions ...	41 „
By private donation	7 „

Periodicals

By purchase	921 Vols.
By exchange or donation from the publishing institutions ...	34 „
By private donation	73 „

Library Stock

Books	1,641 Vols.
Year Books	92 „
Monographs	101 Items
Collected Papers, Proceedings, etc.	156 „
Reports, Governmental and Institutional	279 „
Miscellaneous incl. Pamphlets	154 „
Periodicals	3,283 Vols.
	5,706

Library Periodicals

The library received 186 current periodicals including abstracts, of which 143 are purchased and the remainder given or obtained by exchange. These may be classified according to country of origin :—

British Empire :

Great Britain	51
Africa	3
Australia	1
Canada	2
India	6
Malaya	1

China	26
France	6
Germany	12
Holland	1
Italy	2
Japan	16
Philippine Is.	3
Scandinavia	1
Switzerland	2
United States of America	53
Total	186

Of this periodical literature, there are 98 complete sets, a list of which is given at the end of this appendix.

NUMBER OF PERSONS USING THE LIBRARY

	1935	*1936*
January	400	266
February	313	247
March	294	352
April	251	346
May	268	348
June	265	319
July	234	298
August	227	285
September	248	305
October	302	356
November	285	364
December	290	315
Total	3,378	3,801

BOOKS AND JOURNALS ISSUED

No record is kept of the use of books and journals in the library itself. The following figures show books and journals issued for outside reading and excludes volumes borrowed from outside libraries.

	1935	*1936*
Books	1,812	2,120
Journals	1,261	1,878
Total	3,073	3,998

INTER-LIBRARY LOAN SERVICE 1936

A

Name of Institutions	*Borrowed*	*Lent*
Aurora University	8	
Chinese Medical Association	12	
National Geological Survey of China	3	
National Library of Peiping	2	
National Medical College of Shanghai...	75	60
National Research Institute of Chemistry	57	6
National Research Institute of Physics	2	
Paulun Hospital Library	33	
Peiping Union Medical College	7	
Royal Asiatic Society Library	2	
St. John's University Medical College...	9	3
St. Luke's Hospital Library	20	
Science Society of China	5	
S.M.C., Public Health Department	39	29
Shanghai Woman's Christian Medical College ...		9
University of Shanghai Library	1	
Total ...	275	107

INTER-LIBRARY LOAN SERVICE 1935 and 1936

B

Year	*Co-operating Libraries*		*Books*	*Journals*	*Total*
1935	13	Borrowed	17	156	173
		Lent	6	58	64
1936	16	Borrowed	27	248	275
		Lent	15	92	107

LIST OF PERIODICALS

COMPLETED FROM BEGINNING

(1) JOURNALS :

American Journal of Diseases of Children	1911
American Journal of Hygiene	1921
American Journal of Pathology	1925
American Journal of Physical Anthropology	1918
American Journal of Surgery	1926
American Journal of Tropical Medicine	1921

Annales de Parasitologie humaine et comparee	1923
Annals of Eugenics	1925
Annals of Mathematical Statistics	1930
Annals of the Pickett-Thomson Research Laboratory	1924
Annals of Tropical Medicine and Parasitology	1907
Archives des Institute Pasteur D'Indochine	1925
Archives of Pathology	1926
Archives of Surgery	1920
Biochemical Journal	1906
British Journal of Anæsthesia	1923
British Journal of Experimental Pathology	1920
British Journal of Radiology	1928
British Journal of Surgery	1913
British Journal of Urology	1929
British Medical Journal	1853
Bulletin of Entomological Research	1910
Bulletin of Hygiene	1926
Bulletin of the Neurological Institute of New York	1931
Caduceus	1922
Canadian Medical Association Journal	1911
China Journal	1923
Chinese Economic Journal	1927
Chinese Journal of Physiology	1927
Chinese Medical Journal	1887
Chinese Journal of Zoology	1935
Clinical Science incorporating Heart	1933
Hongkong Naturalist	1930
Human Biology	1929
Indian Journal of Medical Research	1913
Indian Medical Research Memoirs	1924
International Journal of Leprosy	1933
Japanese Journal of Medical Sciences :	
II. Biochemistry	1925
III. Biophysics	1930
IV. Pharmacology	1927
V. Pathology	1926
VI. Bacteriology and Parasitology	1929
IX. Surgery, Orthopedy and Odonology	1927
XI. Gynecology and Tocology	1936
Journal of the American Pharmaceutical Association	1912
Journal of Bacteriology	1916
Journal of the Biological Photographic Association	1932
Journal of the Chinese Chemical Society	1933
Journal of the Chinese Pharmaceutical Association	1936
Journal of Clinical Investigation	1924
Journal of Clinical Medciine	1936
Journal of General Physiology	1918
Journal of Helminthology	1923
Journal of Immunology	1916

Journal of Laboratory and Clinical Medicine	1915
Journal of Nutrition	1928
Journal of Obstetrics and Gynecology of the British Empire	1902
Journal of Parasitology	1914
Journal of Pathology and Bacteriology	1892
Journal of Pharmacology and Experimental Therapeutics	1909
Journal of Urology	1917
Leper Quarterly	1927
Lepra	1900-1917
Leprosy in India	1929
Leprosy Review	1930
Lingnan Science Journal	1922
Malayan Medical Journal	1926
Metron	1920
National Medical Journal of China	1915
Nature	1869
Onderstepoort Journal of Veterinary Science and Animal Industry	1933
Parasitology	1908
Peking Natural History Bulletin	1926
Philippine Journal of Science	1906
Proceedings of the Helminthological Society of Washington	1934
Quarterly Bulletin of the Health Organization of the League of Nations	1932
Quarterly Journal of Experimental Physiology	1908
Quarterly Journal of Medicine	1908
Quarterly Journal of Pharmacy and Pharmacology Cont'n. of Year Book of Pharmacy	1928
Quarterly Journal of Statistics Cont'd. as Statistical Monthly	1935-1936
Radiography	1935
Records of the Malaria Survey of India	1929
Revue D'Immonologie	1935
Science Quarterly	1929-1935
Science Reports Cont'n. of Science Quarterly	1936
South African Journal of Medical Sciences	1935
Stain Technology	1926
Statistical Monthly Cont'n. of Quarterly Journal of Statistics	1931
Tohoku Journal of Experimental Medicine	1920
Transactions of the Royal Society of Tropical Medicine and Hygiene	1907

(2) Bibliographies and Abstracts :

Biological Abstracts	1927
Chemical Abstracts	1907
Index Catalogue of Library of Surgeon-General's Office, U.S. Army	1880
Index to Literature of Food Investigation	1929
Index Universalis	1933
Nutrition, Abstracts and Reviews	1931
Physiological Abstracts	1916
Quarterly Cumulative Index Medicus	1927
Helminthological Abstracts	1932
Review of Applied Entomology : Medical and Veterinary	1913
Tropical Diseases Bulletin	1912

APPENDIX IV

DIVISIONAL CO-OPERATION AND SERVICES

The function of the Directorate is to control services which are required by all Divisions, but each Division, having regard to its special facilities, also controls services for the benefit of other Divisions.

The Division of Clinical Research and Experimental Surgery through its control of beds within the Lester Hospital renders a service to the whole Institute, by supplying the other Divisions with material not only for examination but also for investigation. In its Department of Experimental Surgery, at the Institute, a suite of rooms is provided for the conduct of experimental work on animals under hospital conditions, the examination of surgical material by histological and other methods, while an X-Ray apparatus has been installed and provides a service in Radiology for other Divisions.

The Division of Physiological Sciences maintains laboratory workshops in the basement where apparatus can be repaired and new apparatus made for special purposes ; and through its chemical laboratories conducts a distillation service for the supply of water, absolute alcohol and chloroform to the whole Institute.

The Division of Pathological Sciences provides services in clinical bacteriology, serology, parasitology, tissue pathology, and the preparation of media for bacteriological work. The Division also maintains a standard collection of stock cultures.

The Photographic Laboratory, with a full-time Associate in Scientific Photography, is proving a fundamental asset to the research work in all Divisions. It is equipped for cinematographic pictures of living organisms, photomicrography, clinical and other photography, both in colour and monochrome.

The Department of Medical Statistics, in addition to epidemiological researches already in hand, is organized to assist other Divisions in the statistical presentation of their data and to apply statistical methods to the elucidation of particular research problems.

DIVISION OF CLINICAL RESEARCH

WARD ADMISSIONS.—Patients admitted to the Clinical Unit in the Lester Chinese Hospital, Fifth Floor, between January 1st and December 31st, 1936 :

Medical	135
Surgical	125
Total ...	260

Medical Cases included:

(1) *Nutritional*	
Beri-beri	75
Hypovitaminosis	3
Nutritional Œdema	1
Pellagra	3
Scurvy	3
Feeding Cases	12
Wet Nurses	7
(2) *Parasitic and Infectious*	
Malaria	3
Mumps	1
Tuberculosis	1
Typhoid Fever	6
Scabies	1
Schistosomiasis	1
(3) *Diseases of the Nervous System*	3
(4) *Diseases of the Heart and Circulatory System*	4
(5) *Diseases of the Respiratory System*	1
(6) *Various*	10
	135

Surgical Cases included:	*Cases*	*Operations*
(1) *Congenital*	(3) 2	3
(2) *Traumatic*	8	4
(3) *Inflammatory*		
Bones and Joints, Acute	(3) 2	(3) 2
Bones and Joints, T.B.	(1)	
Alimentary	40	26
Genito Urinary Tract, Acute	29	26
Genito Urinary Tract, T.B.	15	9
Lymph System	1	1
Nervous System	8	0
Skin	6	4
(4) *New Growths and Cysts*	12	8
(5) *Parasitic*	2	1
	125	84

Diagnostic Theatre.—The Diagnostic Theatre in the Clinical Unit has been used for the following purposes:

Cystoscopies	89
Urethroscopies	31
Cystograms	4
Cystoscopic Fulgurations	3
Miscellaneous	1
	128

MEDICAL LABORATORIES.—In addition to the special research work of this department a service of reports of routine examinations is supplied to the Surgical research department and to the Lester Chinese Hospital. The figures are given below :—

LIST OF NUMBERS OF DIFFERENT ROUTINE SPECIMENS EXAMINED BY THE MEDICAL DEPARTMENT FROM JANUARY TO DECEMBER 1936.

Type of Examination	*Number for Med. Dept.*	*Number for Surg. Dept.*	*Number for Hospital*	*Total*
Blood for Cytological Examination	258	148	27	433
Blood for Chemical Examination	1,204	10	63	1,277
Urine for Cytological Examination	330	350	6	686
Urine for Chemical Examination	2,146	2	13	2,161
Cerebro-spinal fluid for Chemical and Cytological Examination	105	25	36	166
Gastric juice for Fractional analysis	4	6		10
Smears for Parasitological and Bacteriological	10	31		41
Sputum and Stool for Examination	141	43	1	185
Blood for Serological Examination			2	2
Scraping for Fungus	25			25
Breast Milk for Chemical Analysis	25			25
Stone from Bladder for Chemical Analysis		14		14
Total	4,248	629	148	5,025

Surgical Laboratories.—In the Surgical laboratories a total of 1,448 Paraffin Blocks were cut for microscopic examination of which 138 were as a service to the Hospital. In addition 314 smear and teased preparations were examined, 43 Frozen sections, 37 analyses of Urinary stones, and 249 Blood counts were reported upon.

Operation Theatre.—The total of operations in the operation theatre for Experimental Surgery amounted to 75, all of which were done under general anæsthesia.

Division of Physiological Sciences

Chemical Rooms.—Supplies to other divisions included, 677 litres of distilled water, 122 litres of absolute alcohol and 36 litres of redistilled chloroform to Division I, and 54½ litres of redistilled alcohol to Division III. Numerous analyses for purity or specific contents including specimens of drinking water for fluorides have been undertaken.

Materia Medica.—A number of botanical and drug specimens have been received for identification and report. Specimens of Chinese drugs have been sent to four museums in Great Britain. The British Museum has kindly identified several lots of botanical material from Shanghai. The work of identification has been of important service in certain poisoning cases, and irregularities in treatment due to impure materials.

Physiological Workshops.—A total of 210 orders were completed during the year: 32 being for Division I, 107 for Division II, 61 for Division III, and 10 for the Directorate. Of this total 74 were for new apparatus, the remainder were for alterations and repairs. Among the new apparatus made was a machine for sharpening microtome knives, a large metal optical bench, and a number of synchronized electrical contacts and associated apparatus for cameras. The equipment of the workshops remains in first class condition.

Division of Pathological Sciences

Clinical Bacteriological Laboratory

Services for the Lester Chinese Hospital (General Wards). Clinical Bacteriological Examinations:

Blood:	B. typhosus	14	
	B. paratyphosus A	1	
	Hæmolytic streptococcus	4	
	Pneumococcus Type I	1	
	Streptococcus viridans	2	
	Staphylococcus	7	
	Miscellaneous findings or no growth	67	Total — 96
Urine:	B. typhosus	7	
	B. coli	73	
	B. dysenteriæ Flexner	2	
	B. enteritidis	2	

	B. mucosus capsulatus	3	
	B. proteus	6	
	B. pyocyaneus	21	
	B. tuberculosis	15	
	Gonococcus	1	
	Hæmolytic streptococcus	2	
	Late lactose fermenting B. coli	24	
	Staphylococcus	51	
	Yeast-like fungus	2	
	Miscellaneous findings or no growth	224	Total — 433
Stool:	B. dysenteriæ Flexner	41	
	B. dysenteriæ Shiga	6	
	B. enteritidis and B. dysenteriæ Schmitz	1	
	B. typhosus	16	
	B. paratyphosus B	1	
	B. paratyphosus C	1	
	Late lactose fermenting B. coli	8	
	Miscellaneous findings or no growth	134	Total — 208
Throat Swab:	B. diphtheriæ	4	
	Hæmolytic streptococcus	112	
	Streptococcus viridans	33	
	Non-hæmolytic streptococcus	15	Total — 164
Pus:	B. coli	7	
	B. tuberculosis	11	
	B. welchii	1	
	Hæmolytic streptococcus	54	
	Non-hæmolytic streptococcus	3	
	Pneumococcus	6	
	Staphylococcus aureus	63	
	Streptococcus viridans	7	
	B. influenza	1	
	B. pyocyanesus	2	
	Miscellaneous findings or no growth	53	Total — 208
Sputum:	B. tuberculosis	1	
	Pneumococcus	3	
	Streptococcus viridans	1	
	Miscellaneous findings	2	Total — 7
Uterine Swab:	Streptococcus fæcalis	1	
	Hæmolytic streptococcus	10	
	Staphylococcus	3	
	B. enteritidis	1	
	Late lactose fermenting B. coli	1	
	Miscellaneous findings	7	Total — 23

Cerebrospinal Fluid :

Meningococcus	2	
Hæmolytic streptococcus	1	
Pneumococcus	1	
Staphylococcus albus	1	
Micrococcus catarrhalis	4	
Miscellaneous findings or no growth	29	Total — 38

Fluids from Synovial Cavities :

B. pyocyaneus	4	
Micrococcus catarrhalis	1	
Staphylococcus aureus	5	
Hæmolytic streptococcus	2	
Streptococcus viridans	1	
B. coli	3	
Pneumococcus	1	
Gonococcus	2	
Miscellaneous findings or no growth	29	Total — 48
Miscellaneous Specimens examined	21	Total — 21
Grand Total		1,246

Autogenous Vaccine :

Staphylococcus aureus	2	
B. coli	2	
Streptococcus and Staphylococcus	1	
Streptococcus viridans	2	
Hæmolytic streptococcus	1	Total — 8

SERVICES FOR THE CLINICAL RESEARCH DIVISION.

Bacteriological Examinations :

Blood :	Pneumococcus	1	
	B. typhosus	3	
	Miscellaneous findings or no growth	12	Total — 16
Urine :	Hæmolytic streptococcus	2	
	Late lactose fermenting B. coli	1	
	B. coli	18	
	B. tuberculosis	19	
	Streptococcus viridans	5	
	Staphylococcus auresus	14	
	B. diphtheroides	2	
	B. proteus	8	
	B. pyocyaneus	3	
	Miscellaneous findings or no growth	58	Total — 130
Stool :	B. morgan No. 1	1	
	B. dysenteriæ Flexner	1	
	B. typhosus	1	
	Miscellaneous findings	13	Total — 16

Pus :	Non-hæmolytic streptococcus	1	
	Streptococcus viridans	2	
	B. welchii	1	
	Hæmolytic streptococcus	1	
	Staphylococcus aureus	1	
	B. coli	2	
	Miscellaneous findings	4	Total — 12
Throat Swab :	Hæmolytic streptococcus	2	
	Staphylococcus aureus	1	Total — 3
Cerebrospinal Fluid :			
	B. tuberculosis	1	
	No growth	3	Total — 4
	Miscellaneous specimens examined	24	Total — 24
	Grand Total		205

SERVICES FOR OTHER HOSPITALS OR INSTITUTIONS

Bacteriological Examinations :

Blood :	B. typhosus	1	
	Miscellaneous findings	2	Total — 3
Urine :	B. coli	3	
	Miscellaneous findings	1	Total — 4
Stool :	B. dysenteriæ Sonne	1	
	B. dysenteriæ Flexner	1	
	B. dysenteriæ Shiga	3	
	B. morgan No. 1	38	
	Late lactose fermenting B. coli	2	
	B. pyocyaneus	1	
	B. alcaligenes	1	
	Miscellaneous findings	13	Total — 60
Throat Swab :	Hæmolytic streptococcus	7	
	Streptococcus viridans	1	
	B. diphtheriæ	2	
	Pneumococcus	1	Total — 11
Pus :	B. tuberculosis	2	
	Staphylococcus aureus	4	
	Miscellaneous findings	2	Total — 8
Sputum :	B. Tuberculosis	2	
	Streptococcus viridans	1	Total — 3

Nose Swab :	B. influenza	1	
	B. diphtheriæ	1	Total — 2
Ear Swab :	B. tuberculosis	1	
	B. diphtheroides	1	
	Staphylococcus aureus	1	Total — 3
	Grand Total		94

Autogenous Vaccine :

Streptococcus...	1	
Staphylococcus	1	Total — 2

SEROLOGICAL LABORATORY :

Serological examinations performed during 1936 for Lester Chinese Hospital, were as follows :—

	Positive	*Negative*	*Anticomplementary*	*Doubtful*	*Total*
Wassermann Test					
L.C.H.	1,920	2,482	116	270	4,788
Clinical Unit	48	254	11	40	353
Kahn Test					
L.C.H.	2,195	2,381	—	212	4,788
Clinical Unit	84	233		36	353
Widal Test					
L.C.H.	140	106	—	—	246
Clinical Unit	13	8			21
Weil-Felix Test					
L.C.H.	2	18	—	—	20
B. melitensis and abortus agglutination Test					
L.C.H.	—	3	—	—	3
Clinical Unit	—	2	—	—	2

Total specimens examined for Lester Chinese Hospital	9,845
Total specimens examined for Clinical Unit	729

Serological examinations performed during 1936 for other hospitals, etc. were as follows :—

	Positive	*Negative*	*Total*
Wassermann and Kahn Tests			
Health Laboratory of Greater Shanghai	7	3	10
Widal Test			
St. Luke's Hospital	21	14	35
Church Missionary Hospital, Yunnan	4	—	4
Weil-Felix Test			
St. Luke's Hospital	4	14	18
Soochow Hospital, Soochow	1	—	1
Elizabeth Blake Hospital, Soochow	—	2	2
B. melitensis and abortus agglutination Test, St. Luke's Hospital	—	12	12
Church Missionary Hospital, Yunnan	—	1	1
Soochow Hospital, Soochow	—	1	1

PARASITOLOGICAL LABORATORY :

Services for the Lester Chinese Hospital—170 examinations were made on specimens from 118 cases.

Services for the Clinical Unit—343 examinations were made on specimens from 259 cases.

Fæcal specimens were usually sent to us from the Hospital and Clinical Unit when a special examination for Schistosome ova was required, for the identification of worms after treatment, or in cases of suspected amœbic dysentery. The following are the chief findings in the specimens examined.

Entamœba histolytica cysts	9 cases
Entamœba histolytica free forms	4 ,,
Entamœba coli cysts	26 ,,
Entamœba coli free forms	2 ,,
Endolimax nana cysts	27 ,,
Iodamœba butschlii cysts	4 ,,
Giardia lamblia cysts	23 ,,
Trichomonas hominis	7 ,,
Chilomastix mesnili cysts	1 case
Chilomastix mesnili free forms	1 ,,
Tricercomonas cysts	1 ,,
Leishman donovan bodies	2 cases
Plasmodium falciparum	1 case
Blastocysts	135 cases
Ascaris ova	94 ,,
Hookworm ova	74 ,,

Trichuris ova	145 cases
Schistosoma japonicum ova	23 „
Clonorchis sinensis ova	15 „
Fasciolopsis buski ova	5 „
Paragonimus ova	1 case
Hymenolopis nana ova	1 „
Tænia ova	1 „

TISSUE PATHOLOGY LABORATORY:

In addition to 283 specimens sent for diagnosis by hospitals outside Shanghai and 18 autopsies which are mentioned in the body of the report, the laboratory received biopsy specimens for diagnosis from the following Shanghai Hospitals:

St. Luke's Hospital	323
Lester Chinese Hospital	192
St. Elizabeth's Hospital	51
Shanghai Public Hospital, Nantao	5
Bethel Hospital	3
Sacred Heart Hospital	2
U.S. Fourth Marines Hospital	1
Women's Hospital, Great Western Road	1

Tissue pathological examinations in connection with research work in the Institute were distributed as follows:—

Division of Physiological Sciences	131
Division of Clinical Research	1
Serological Laboratory	48
Bacteriological Laboratories	17
Clinical Bacteriological Laboratory	13
Parasitological Laboratories	194

ENTOMOLOGICAL LABORATORIES

The following specimens have been received for identification:

Beetles destroying books	Library
Blood worms from water supply	S.M.C. Health Dept.

MEDIA ROOM

The amount of Media made during year 1936 was as follows:

Total amount of Media	421.62 litres
Total tubes distributed	33,000
Total flasks distributed	1,040

Of the above total amount of Media:

Meat Infusion Bouillon	amounted to	136.28 litres
Meat Infusion Agar	„ „	127.50 „
Brom Cresol Purple Sugar Medium	„ „	58.38 „
Nutrient Gelatine	„ „	19.70 „
Nutrient Agar	„ „	15.95 „
MacConkey's Solid Medium	„ „	14.49 „
C.B.P.P. Broth	„ „	12.45 „

The remaining 36.87 litres consisted of Lœffler's Blood Serum Slant, Alkaline Nutrient Agar, Petroff's Egg Medium, Lead Acetate Agar, Potato Slant, Urea Splitting Medium, Hiss Serum Water, Litmus Milk, Glycerine Bile Potato Medium, Hormone Broth, Hormone Agar, Cooked Meat Medium, Sabourand's Medium, Nitrate Broth, Ox Bile, N. N. N. Medium, Meat Infusion Semi Solid Medium, Glycerine Agar, Glycerine Broth, Peptone Water, Bordet-Gengou's Media and Glucose Agar.

PHOTOGRAPHIC LABORATORY

Condensed Summary of Work Done in 1936 Jan.-Dec.

For	*Photo-micrographs*	*All other subjects*	*Totals*	*Prints made*	*Slides made*	*Cine-film taken*
Directorate	17	394	411	560	99	—
Division I	45	105	150	678	170	20 feet
Division II	34	204	238	882	166	158 „
Division III	232	708	940	2,584	663	488 „
Library	12	24	36	175	32	—
Experimental	2	22	24	24	13	—
Special	29	54	83	348	124	—
Technical Inst. ...	—	53	53	127	2	—
Photographic Dept. ...	—	30	30	32	33	—
TOTALS	371	1,594	1,965	5,410	1,302	666

APPENDIX V

MEMORANDUM OF SPECIMENS SENT TO OTHER INSTITUTIONS AND SCIENTIFIC WORKERS

Institution	*Scientific worker*	*Nature of Specimens*	*Illustrating or Entitled*	*Remarks*
Tulane Univ. of Louisiana, New Orleans, U.S.A.	Dr. E. C. Faust	Fæces containing S. japonicum ova.	Schistosomiasis	Teaching
London School of Hygiene and Tropical Medicine.	Prof. R. T. Leiper	Fæces containing S. japonicum ova.	Schistosomiasis	Teaching
		50 S. J. worms.	Schistosomiasis	,,
		30 Metagonimus	Metagonimus	,,
School of Trop. Medicine, Univ. of Liverpool.	Prof. T. Southwell	Potamon snail Melania snail Paragonimus ova 1 slide Paragonimus ova 1 Adult Paragonimus	Paragonimus	Teaching
		Clonorchis ova Bithynia snails 1 slide of Clonorchis 10 Clonorchis worms 1 slide of cat's liver 1 slide of dog's liver 2 Paraffin blocks—cat's liver	Clonorchis	,,
		1 slide Schistosome ova Schistosome ova 1 slide with Miracidia 1 slide with Cercaria 2 slides Adult worms 30 Adult worms 1 slide dog's intestine 1 slide human lung 1 slide mouse liver 2 blocks human liver 2 blocks human colon 1 block rabbit liver 1 block dog's intestine	Schistosomiasis	,,

Institution	*Scientific worker*	*Nature of Specimens*	*Illustrating or Entitled*	*Remarks*
School of Trop. Medicine, Univ. of Liverpool.	Prof. T. Southwell	1 block guinea-pig's lung	Schistosomiasis	Teaching
		1 phial O. hupensis		
		1 chart	Life cycle of Paragonimus	„
		1 chart	Life cycle of Clonorchis	„
		1 chart	Life cycle of S. japonicum	„
Univ. of Paris.	Prof. E. Brumpt	100 Borrelis recurrentis in ticks	Transmission investigation	Research
The Royal Infirmary, Sheffield, England.	Dr. L. C. D. Hermitte	12 Helminthic specimens	Schistosomiasis Clonorchis sinensis Fasciolopsis buski Paragonimus	Teaching
The University, Glasgow.	Dr. M. Jepps	Rabbit fæces with ova. of S. japonicum	Schistosomiasis	Teaching
National Research Institute, Hampstead.	Dr. F. F. Tang	1 tube Rabies virus-fix	Virus studies	Research
Lister Institute, London.	Dr. A. Felix	1 vial of 30cc serum	New curative anti-typhoid serum (concentrated)	Research
Univ. of Sydney, Sydney.	Prof. H. K. Ward	1 culture	B. typhosus " 1421 "	Teaching
		1 culture	B. dysentery Shiga	„
Army Medical School, Washington.	Dr. A. P. Hitchens	2 cultures	B. typhosus " 2162 " and " 2200 "	Teaching and research
University of Rochester, Rochester, N. Y.	Prof. O. R. McCoy	7 Helminthic specimens	Paragonimus	Teaching
		A few Fasciolopsis cysts attached to the skin of red water caltrops.	Fasciolopsis buski	„
		10 slides Microfilaria bancrofti		
		4 slides of filarial development	Entomology	Teaching
		8 species of mosquito larvæ		

Institution	*Scientific worker*	*Nature of Specimens*	*Illustrating or Entitled*	*Remarks*
University of Hongkong, Hongkong.	Prof. L. J. Davis	7 Helminthic specimens	Schistosomiasis Paragonimus Ankylostoma duodenale	Teaching and research
University of Hongkong, Hongkong.	Dr. J. S. Guzdar	2 cultures 1 culture 1 culture	B. pestis V. cholera B. typhosus "2162"	Teaching and research
Lingnan University, Canton.	Dr. F. G. Wallace	9 Helminthic specimens	Paragonimus Fasciolopsis buski Schistosomiasis	Teaching and research
Cheeloo University, Tsinan.	Dr. F. G. Winfield	11 Helminthic specimens	Paragonimus Fasciolopsis buski Schistosomiasis Clonorchis sinensis	Teaching and research
National Central University, Nanking.	Dr. Y. Chen	20 Helminthic specimens 2 charts	Fasciolopsis buski Paragonimus Schistosomiasis Life cycle of Fasciolopsis buski and Schistosomiasis	Teaching and research
Yenching University, Peiping.	Dr. Y. C. Hsu	6 Helminthic specimens	Paragonimus Fasciolopsis buski Schistosomiasis	Teaching
Central Field Health Station, Nanking.	Dr. L. C. Ling	Adults of 14 species of Shanghai Mosquitoes Larvæ of 13 species of Shanghai Mosquitoes	Entomology	Research
Dept. of Biology, Hangchow Univ., Hangchow.	Prof. A. W. March	6 Helminthic specimens	Schistosomiasis Paragonimus Fasciolopsis buski	Teaching and research
Keylock & Pratt, Shanghai.		5 gms. Dried dog distemper virus	Immunization	Research

Institution	*Scientific worker*	*Nature of Specimens*	*Illustrating or Entitled*	*Remarks*
Hwa Mei Hospital, Ningpo.	Dr. L. C. Ting	Sera	Anti-typhosus Anti-paratyphosus A Anti-paratyphosus B Anti-paratyphosus C Anti-dysenteriæ Shiga Anti-dysenteriæ Flexner	Diagnosis
St. Luke's Hospital, Shanghai.	Miss A. A. MacRee	5 Type cultures	Widal reactions	Diagnosis
St. Luke's Hospital, Shanghai.	Miss A. A. MacRee	1 Type culture	Weil-Felix Reactions	Diagnosis
Hope and Wilhelmina Hospital, Amoy.	Dr. C. H. Holleman	3 cultures	B. typhosus B. paratyphosus A B. paratyphosus B	Diagnosis
National Epidemic Prevention Bureau, Nanking.	Dr. Edgar Tsen	2 cultures	B. typhosus "2162" and "2200"	Research
Hongkong University, Hongkong.	Prof. L. J. Davis	1 culture 1 culture 2 cultures	B. typhosus "2162" V. choleræ Plague	Research
Laboratoire Municipal, F.M.C., Shanghai.	Dr. Raynal	1 culture 2 cultures 2 cultures 2 vials 2 vials 2 vials	V. choleræ Paratyphoid "A" Paratyphoid "B" Cholera antiserum Paratyphoid "A" Paratyphoid "B"	Research
Church Missionary Hospital, Yunnanfu.	Dr. Watson	2 cultures	B. typhosus "H" and "O" 901	Diagnosis
West China Union Univ., Chengtu.	Dr. T. H. Williams	2 cultures	B. typhosus "H" and "O" 901	Research
Union Hospital, Changchow, S. Fukien.	Dr. N. B. Slater	2 cultures 3 cultures	B. typhosus Rawlings B. typhosus "O" 901 Paratyphoid A, B. and C.	Diagnosis

Institution	*Scientific worker*	*Nature of Specimens*	*Illustrating or Entitled*	*Remarks*
Central Field Health Stat., Nanking.	Dr. C. P. Li	2 cultures 3 cultures	B. typhosus " O " 901 B. typhosus " H " 901 Pneumococcus type I, II, III	Research
	Dr. I. G. Karnitzsky	3 cultures	B. typhosus Rawlings B. paratyphosus A and B	Diagnosis
The Clinical Diagnosis Institute, Shanghai.	Dr. S. D. Joffick	2 cultures	Bruc. Bang Bruc. melitensis	Diagnosis
Church General Hospital, Wuchang, Hupeh.	Dr. W. H. Tseng	2 cultures	B. melitensis B. abortus	Diagnosis
St. Luke's Hospital, Shanghai.		2 cultures	B. typhosus " H " and " O " 901	Diagnosis
Keylock & Pratt, Shanghai.	Dr. J. Edgar	10 vials each containing 30cc	B. Bronchosepticus vaccine	Research
P. U. M. C., Peiping.	Dr. H. P. Sia	2 strains	B. typhosus " 2162 " and " 2200 "	Research
North-west Epid. Prevention Bureau, Lanchow.		1 strain	Pleuro-pneumonia virus	Research
Mongolia-Suiyuan Epidemic Prevention Bureau.		1 strain	Pleuro-pneumonia virus	Research
Lister Institute, London	Dr. A. Felix	3 vials each containing 30cc	New curative anti-typhoid serum	Research
Central Hospital, Nanking	Dr. S. N. Cheer	90 vials each containing 30cc	New curative anti-typhoid serum	Research and Treatment
Church Missionary Hospital, Yunnanfu.	Dr. Watson	30 vials each containing 30cc	New curative anti-typhoid serum	Research and Treatment
St. Luke's Hospital, Shanghai.	Dr. M. S. Huang	42 vials each containing 30cc	New curative anti-typhoid serum	Research and Treatment

Institution	*Scientific worker*	*Nature of Specimens*	*Illustrating or Entitled*	*Remarks*
P. U. M. C., Hospital, Peiping.	Dr. O. K. Khaw	36 vials each containing 30cc	New curative anti-typhoid serum	Research and Treatment
Church General Hospital, Wuchang, Hupeh.	Dr. W. H. Tseng	30 vials each containing 30cc	New curative anti-typhoid serum	Research and Treatment
Margaret Williamson Hospital, Shanghai.	Dr. Ruth Wong	30 vials each containing 30cc	New curative anti-typhoid serum	Research and Treatment
Lester Chinese Hospital		16 vials each containing 30cc	New curative anti-typhoid serum	Research and Treatment
Municipal Hospital, Greater Shanghai.	Dr. H. T. Chen	15 vials each containing 30cc	New curative anti-typhoid serum	Research and Treatment
The Children's Hospital, Shanghai.	Dr. C. L. Kao	9 vials each containing 30cc	New curative anti-typhoid serum	Research and Treatment
Red Cross Hospital, Shanghai.	Dr. S. B. Wang	6 vials each containing 30cc	New curative anti-typhoid serum	Research and Treatment
The Women's Hospital, Shanghai.	Dr. K. C. Sun	6 vials each containing 30cc	New curative anti-typhoid serum	Research and Treatment
The Russian Orthodox Confraternity Hospital, Shanghai.	Dr. Kasakoff	5 vials each containing 30cc	New curative anti-typhoid serum	Research and Treatment
	Dr. W. S. Fu	3 vials each containing 30cc	New curative anti-typhoid serum	Research and Treatment

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